

“I UNDERSTAND EVERYTHING YOU SAY, I JUST DON’T SPEAK IT”: THE ROLE OF
MORPHOLOGY IN THE COMPREHENSION OF SPANISH BY RECEPTIVE HERITAGE
BILINGUALS

by

Bonnie C. Holmes

Copyright © Bonnie C. Holmes 2017

A Dissertation Submitted to the Faculty of the

GRADUATE INTERDISCIPLINARY PROGRAM IN SECOND LANGUAGE ACQUISITION
AND TEACHING

In Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

2017

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Bonnie Holmes, titled “I understand everything you say, I just don’t speak it”: The role of morphology in the comprehension of Spanish by receptive heritage bilinguals, and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

_____ Date: (8/5/2016)
Sara Beaudrie

_____ Date: (8/5/2016)
Janet Nicol

_____ Date: (8/5/2016)
Ana Carvalho

_____ Date: (8/5/2016)
Diego Pascual y Cabo

Final approval and acceptance of this dissertation is contingent upon the candidate’s submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

_____ Date: (8/5/2016)
Dissertation Director: Sara Beaudrie

_____ Date: (8/5/2016)
Dissertation Director: Janet Nicol

STATEMENT BY AUTHOR

This dissertation has been submitted in partial fulfillment of the requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this dissertation are allowable without special permission, provided that an accurate acknowledgement of the source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: Bonnie C. Holmes

ACKNOWLEDGEMENTS

The completion of this study would not have been possible without the unwavering support from my family and loved ones or the encouragement and guidance I received from my advisers, colleagues, and friends at the University of Arizona. I would like to first express my deepest appreciation to my committee members. Your expertise, direction and feedback have been invaluable and I am a better academic as a result.

Dr. Sara Beaudrie first welcomed me to the field of Spanish as a heritage language, and the opportunities this provided have significantly altered the trajectory of my own research and career. You have taught me a tremendous amount about teaching and researching heritage bilingualism, and I am forever grateful. Dr. Janet Nicol was instrumental in training me in laboratory-based research methodologies, and generously made laboratory space and resources available to me. Your guidance and feedback over the last few years have played an important role in so much of this dissertation, and it would not have been possible without you. I am deeply appreciative. Dr. Ana Carvalho provided invaluable insight into the various sociolinguistic phenomena that are related to this research. The knowledge you shared with me has helped broaden my understanding of contact bilingualism in the US, and I am a more well-rounded linguist as a result. Thank you so much. Dr. Diego Pascual y Cabo was instrumental in helping to develop various aspects of this study, including teaching me to question assumptions about heritage bilingualism that I previously took as a given. Your suggestions have greatly improved this work and as a relatively recent graduate yourself, your advice as to my next steps has very appreciated. Thank you for everything. Thank you also to Dr. Peter Ecke, who served on my examination committee, for your guidance and the additional perspective you provided.

I would also like to thank the Second Language Acquisition and Teaching program and the Graduate Interdisciplinary Program for funding that enabled me to focus on this research, as well as to present portions of it at conferences for feedback. I'm also appreciative of the teaching assistantship funding and the teaching responsibilities with which I was entrusted through the Spanish & Portuguese Department. The experience I gained as an instructor has taught me so much as an educator. I am also indebted to all the individuals who worked behind the scenes to

support me throughout the Ph.D. program. These include Robin Staples and Kelley Merriam Castro who kept things running in the SLAT office, my undergraduate lab assistants Roxanne Francies and Victoria Villaseñor, who were such a tremendous help and pleasure to work with during the data collection process. Thank you also to Joseph Casillas, Mohammad Torabi and Mark Borgstrom for their valuable assistance with my statistical analyses.

To my family, and especially my parents, Mark and Cathy Holmes, I am so grateful for your unwavering love and support during this process and everything leading up to it. Mom, you have been a constant source of strength and encouragement and I cannot express enough how much I appreciate you. To my incredible community of friends who have been a lifeline and a source of so much joy, and to Tami, who will never be forgotten –I would not be here without you. And to Javier, *mi amor* – you have been a constant source of strength, insight and inspiration. I cannot put into words how deeply I appreciate the love you have given me and the sacrifices you have made so I could get to this point. I owe so much of this to you.

DEDICATION

*For my students,
the participants in this study, and all
Spanish heritage bilinguals striving to maintain your language
in the face of so many circumstances that would have you forget.
Behind the statistics and figures, this is really a testament
to your resilience and courage.*

“Who is to say that robbing a people of
its language is less violent than war?”

-Ray Gwyn Smith

TABLE OF CONTENTS

LIST OF FIGURES	11
LIST OF TABLES	12
ABSTRACT	13
CHAPTER 1 - INTRODUCTION.....	15
1.1 Background.....	15
1.2 Statement of the Problem.....	19
1.3 Conceptual Framework.....	20
1.4 Purpose of the Study	22
1.5 Research Questions, Hypotheses and Experimental Design.....	23
1.5.1 Research questions.....	23
1.5.2 Hypotheses	24
1.5.3 Experimental design.....	26
1.6 Contribution of the Study.....	26
1.7 Overview of the Dissertation	28
CHAPTER 2 – REVIEW OF THE LITERATURE	30
2.1 Introduction.....	30
2.2 Definition of Key Terms.....	30
2.2.1 Competence, performance and proficiency	31
2.2.2 Heritage language	34
2.2.3 Heritage language bilingual / learner	35
2.2.4 Receptive bilingualism.....	36
2.3 Heritage Spanish Bilingualism in the US	37
2.4 Spanish Morphology and Childhood Acquisition.....	41
2.4.1 Gender agreement / assignment	42
2.4.2 Subject/Verb agreement.....	44
2.4.3 Tense	46
2.4.4 Aspect	48
2.4.5 Mood.....	50
2.4.6 Summary	53
2.5 Morphosyntactic knowledge in adult Spanish heritage bilinguals	53
2.5.1 Gender agreement	54
2.5.2 Subject/Verb agreement & present/preterit distinctions	55
2.5.3 Preterit/Imperfect aspect	56
2.5.4 Indicative/subjunctive mood.....	58
2.5.5 Summary	61
2.6 Theoretical considerations regarding the linguistic systems of heritage bilinguals	62
2.6.1 Theories related to attrition.....	63
2.6.2 Heritage grammars as incomplete.....	64

2.6.3 Heritage grammars as distinct varieties	66
2.7 Spanish RHBs in the US	69
2.8 Conclusion	70
CHAPTER 3: METHODOLOGY	71
3.1 Introduction.....	71
3.2 Research questions.....	75
3.3 Predictions.....	77
3.4 Subjects and Recruitment	79
3.4.1 Recruitment of Spanish RHBs	79
3.4.2 Spanish RHB language history	83
3.4.3 Recruitment of comparison and control groups.....	86
3.5 Experimental Procedure.....	88
3.6 Contextualized Listening Comprehension Task	89
3.6.1 Materials	90
3.6.2 Procedure and data collection	92
3.7 Elicited Imitation Task.....	93
3.7.1 Materials	95
3.7.2 Procedure and data collection	96
3.8 Self-paced Aural Grammaticality Judgment Task.....	97
3.8.1 Materials	99
3.8.2 Procedure and data collection	106
3.9 Aural Morpheme Interpretation Task	107
3.9.1 Materials	108
3.9.2 Procedure and data collection	115
3.10 Biographical Questionnaire	115
3.10.1 Materials	116
3.10.2 Procedure and data collection	116
3.11 Analysis of Data and Comparison of Tasks:.....	117
3.11.1 Analysis of data.....	117
3.11.2 Correlations between tasks	119
3.12 Conclusion	120
CHAPTER 4 – RESULTS	121
4.1 Introduction.....	121
4.2 Research Questions	121
4.3 Global Comprehension Ability:	
Results of Contextualized Listening Comprehension Task	123
4.3.1 Summary of findings for research question 1	131
4.4 Proficiency: Results of Elicited Imitation Task	132
4.4.1 Summary of findings for research question 2	141
4.5 Grammatical Competence:	
Results of Self-paced, Aural Grammaticality Judgment Task.....	141
4.5.1 Overall accuracy	145
4.5.2 Accuracy by morphological condition.....	147

4.5.3 Listening time data.....	153
4.5.4 Summary of findings for research question 3	157
4.6 Semantic Knowledge: Results of Morpheme Comprehension Task	159
4.6.1 Overall accuracy	162
4.6.2 Accuracy by morphological condition.....	164
4.6.3 Summary of findings for research question 4	181
4.7 Correlations between experimental tasks.....	183
4.7.1 Summary of findings for research question 5	187
4.8 Summary of Empirical Data	188
CHAPTER 5 – DISCUSSION AND CONCLUSIONS	190
5.1 Introduction.....	190
5.2 Spanish RHB Knowledge of Morphological Well-formedness.....	191
5.3 Spanish RHB Knowledge of Morphology and Semantic Contrasts	193
5.4 The Interrelatedness of Morphological Knowledge and Global Language Abilities	195
5.5 The Characterization of RHB Language Abilities:	
Summary of findings for research question 6	197
5.6 Limitations of the Study.....	204
5.7 Avenues for Future Research.....	205
5.8 Final Thoughts and Implications for Pedagogy and Language Maintenance	206
APPENDIX A – MASS SURVEY FOR RECRUITMENT.....	208
APPENDIX B – ORAL PRODUCTION TASK	210
APPENDIX C – CONSENT FORM	211
APPENDIX D – ELICITED IMITATION TASK	214
APPENDIX E – ELICITED IMITATION RATING CRITERIA.....	216
APPENDIX F – AURAL, SELF-PACED GRAMMATICALITY JUDGMENT TASK	218
APPENDIX G – BIOGRAPHICAL QUESTIONNAIRE	223
APPENDIX H – MORPHEME COMPREHENSION TASK.....	231
REFERENCES	246

LIST OF FIGURES

Figure 1-1: Continuum of bilingualism (Valdés, 2005).....	17
Figure 3-1: Example of image provided by contextualized listening comprehension task	92
Figure 4-1: Frequency distribution – scores for Spanish RHB group on contextualized comprehension task	128
Figure 4-2: Frequency distribution of scores by participant group – contextualized listening comprehension task.....	130
Figure 4-3: Boxplot of distribution of scores for the contextualized comprehension task.....	131
Figure 4-6: Boxplot of distribution of scores for the elicited imitation task	139
Figure 4-7: Proficiency level group by subject group – elicited imitation task.....	140
Figure 4-8: Overall average accuracy on aural, self-paced GJT.....	145
Figure 4-9: Average accuracy by morphological condition on aural, self-paced GJT	148
Figure 4-10: Average accuracy in the gender condition on aural, self-paced GJT.....	151
Figure 4-11: Average accuracy by grammaticality and morphological condition – aural, self-paced GJT	152
Figure 4-12: Average listening times by morphological condition – aural, self-paced GJT	154
Figure 4-13: Average listening times by morphological condition and grammaticality – aural, self-paced GJT	155
Figure 4-14: Correlation between listening times and accuracy rates – aural, self-paced GJT ..	157
Figure 4-15: Overall average accuracy for morpheme comprehension task	163
Figure 4-16: Average accuracy scores by morphological condition on aural morpheme comprehension task.....	165
Figure 4-17: Average accuracy on morpheme comprehension task – verbal morphology	168
Figure 4-18: Average accuracy on morpheme comprehension task – gender agreement	170
Figure 4-19: Average accuracy on morpheme comprehension task – tense morphology	174
Figure 4-20: Average accuracy on morpheme comprehension task – aspect morphology.....	176
Figure 4-21: Average accuracy on morpheme comprehension task – mood morphology	179

LIST OF TABLES

Table 2-1: Model paradigms for grammatical person and number agreement – present tense verbs	45
Table 2-2: Model paradigms for the present and preterit tense of regular verbs	46
Table 2-3: Model paradigms for the preterit versus imperfect tense of regular verbs	49
Table 2-4: Model paradigms for the indicative versus subjunctive mood of regular verbs	50
Table 3-1: Spanish RHB Language History	85
Table 3-2: RHB Comfort level when listening to and speaking Spanish	86
Table 3-3: Number of subjects by recruitment context	88
Table 3-4: Number of subjects by type of bilingualism	88
Table 3-5: Biographical questionnaire items by category	116
Table 3-6: Data collected for each experimental task.....	117
Table 3-7: Representative measure for each laboratory task	120
Table 4-1: Raw Spanish RHB scores for contextualized listening comprehension task	124
Table 4-2: Descriptive statistics for Spanish RHB results on contextualized comprehension task used to determined participant eligibility	126
Table 4-3: Descriptive statistics for contextualized comprehension task – eligible Spanish RHBs and comparison/control groups	126
Table 4-4: Frequency distribution – scores for Spanish RHB group on contextualized comprehension task	127
Table 4-5: Individual Spanish RHB scores for elicited imitation task	134
Table 4-6: Descriptive statistics for Spanish RHB results on elicited imitation task	135
Table 4-7: Descriptive data for elicited imitation task.....	138
Table 4-8: Proficiency level by subject group – elicited imitation task	140
Table 4-9: Overall average accuracy for aural self-paced grammaticality judgment task.	145
Table 4-10: Results of mixed effects model for mean accuracy by participant group on the aural, self-paced GJT	146
Table 4-11: Average accuracy by morphological condition on self-paced, aural GJT	147
Table 4-12: Pairwise comparisons – Spanish RHB accuracy by morphological conditions on the self-paced, aural GJT:	149
Table 4-13: Overall average accuracy for the morpheme comprehension task	162
Table 4-14: Results of mixed effects model for mean accuracy on aural morpheme interpretation task (Spanish RHB group set as reference level)	164
Table 4-15: Average accuracy scores by morphological condition - aural morpheme interpretation task.....	165
Table 4-16: Pairwise comparisons between RHB mean accuracy rates by morphological condition	166
Table 4-16: Results of Pearsons’ correlation test between the four experimental tasks.....	184

ABSTRACT

This study contributes to what is known about the nature of unbalanced bilingualism that emerges in language contact situations by examining the morphological knowledge of Spanish receptive heritage bilinguals (RHBs). RHBs were exposed to Spanish in their homes and communities but received formal schooling in English. These bilinguals have been described as being “on the verge of culminating the language shift towards English monolingualism” (Beaudrie, 2009a, p. 86), although despite this they report the ability to understand but not speak their heritage language. While the interpretation and production of inflectional morphology are difficult for more proficient heritage bilinguals (Montrul, 2008, 2009), little is known about the extent to which knowledge of morphology is measurable in HRBs or how it contributes to their ability to comprehend spoken Spanish.

To answer these questions, 33 adult Spanish RHBs completed four, aurally-presented on- and off-line experimental tasks designed to assess their underlying grammatical competence, their receptive comprehension skills, and their proficiency without requiring that participants speak, read or write in Spanish. These tasks and the skills they assessed are listed below.

- 1) A self-paced, aural grammaticality judgment task examined whether RHBs have access to the rules that govern the well-formedness of specific inflectional morphemes, including gender and subject/verb agreement, as well as tense, aspect, and mood morphemes.
- 2) A morpheme interpretation task assessed whether RHBs interpret the meaning supplied by bound morphemes and distinguish between semantic contrasts.

- 3) A contextualized listening comprehension task measured the listening comprehension abilities of RHBs.
- 4) An elicited imitation task measured the proficiency of RHBs.

The results of this study show that RHBs do have underlying morphological competence and are able to distinguish between grammatical and ungrammatical morphemes despite their limited language skills in other domains. Additionally, these bilinguals interpret the meaning supplied by bound morphemes, although access to the rules governing both the structure and the semantics of these morphemes decreases in accordance with the order in which they were acquired in childhood. RHBs understand the majority of what they hear when listening to spoken Spanish, and on average their proficiency ranges from low to intermediate levels. An analysis of the linear relationship between the results of the four experimental tasks revealed that the extent to which listening comprehension abilities and proficiency correspond to morphological knowledge in Spanish RHBs is dependent on the degree of access that these bilinguals have to the semantic information provided by functional morphemes.

The results of this study show that while the core syntax of Spanish RHBs is intact, semantic knowledge may not have been mapped to certain morphemes during the acquisition process. These results are analyzed in tandem with various hypotheses that have been recently put forth to account for the linguistic outcomes of contact bilingualism, and an argument is made for considering heritage grammars as completely acquired but distinct language varieties.

CHAPTER 1 - INTRODUCTION

1.1 Background

The Spanish language and its speakers have historically occupied an important but complex linguistic, political, and cultural space in what is now the United States (Fishman, 1966; Lopez & Minushkin, 2008; Penny, 2002; Perea, 2003; Villa, 2002). Despite the current presence of large numbers of Spanish-speakers in the US¹, Spanish nevertheless exists as a minority language in relation to English. A minority language is defined as such because it has a comparatively smaller number of speakers in relation to the more commonly spoken majority language, and because it occupies a “less privileged position vis-à-vis the majority language” (Núñez, 2016, p. 48; Mowbray, 2012). While debates related to language policies in the US often become entangled with issues concerning immigration, Spanish is not solely an immigrant language; it is indigenous to geographic areas previously belonging to Mexico that now constitute US territory, and was the lingua franca of the Southwest until the mid-nineteenth century (Villa & Rivera-Mills, 2009). The Treaty of Guadalupe Hidalgo (1848) and the Gadsden Purchase (1853) transferred large areas of Mexican territory to the US, establishing an official political and unofficial linguistic border between the two countries. As a result, populations of Mexican Spanish speakers found themselves abruptly circumscribed by a foreign national border, and subsequently, by the English language. A slogan associated with the immigrant

¹ 2013 US Census data estimates that 38.4 million U.S. residents 5 years and older speak Spanish at home.

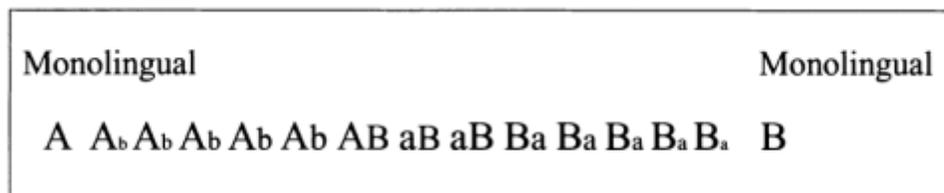
rights movement in the US invokes this historical fact, asserting: “We didn’t cross the border. The border crossed us”.

Although English has never been established as an official language of the US, it is nevertheless the most frequently spoken, and is primarily used both among the general population and for official matters. The close contact between Spanish and English as well as internal processes of language change (e.g. lexical gains and losses, changes in semantics, morphological simplification, grammaticalization, etc.) have resulted in patterns of Spanish language shift and loss, even in geographical areas where established communities of Spanish speakers reside in close proximity to Spanish-speaking territories (Cuza, 2002; Silva-Corvalán, 1991, 1994, 2001; Martínez-Mira, 2005; Zentella, 1997). Structures that seem to be particularly affected include nominal and verbal morphology (see section 1.3 below for a summary). For example, Silva-Corvalán’s 1991 and 1994 studies of Spanish in Los Angeles indicate that by the third generation the Spanish verbal system has been significantly reduced. Similarly, Martínez-Mira (2009) shows that the use of the subjunctive declines in accordance with speaker generation. The subtractive bilingualism that is often a result of “English-only” language policies in the public-school system has likely helped accelerate patterns of shift and loss (Menken & Kleyn, 2010; Stritikus, 2002), as have narratives and ideologies in the US which stigmatize the Spanish language and its speakers (Carreira, 2000; Carter, 2014; García, 2005; Leeman, 2005, 2012, 2015; Leeman & Martínez, 2007; Martínez, 2003, 2009; Otheguy, 1982; Roca, 2003; Suarez, 2002; Valdés, 1981, 1989, 1995, 1997, 2000, 2005; Valdés-Fallis, 1978). Other factors affecting the degree to which Spanish is maintained or lost include continuing immigration from Spanish-speaking countries, patterns of language use at home and in the community, contact

with Spanish-language media, and affective factors and personal motivation (Beaudrie & Ducar, 2005; Beaudrie & Fairclough, 2012; Leeman, 2012; Martínez, 2009; Otheguy & Zentella, 2012; Silva-Corvalán, 2014).

One group of bilinguals that can contribute to our understanding of how the acquisition of a minority language may result in situations of unbalanced bilingualism are Spanish-English receptive heritage bilinguals (Spanish RHBs). Spanish RHBs are a subset of a population in the US often referred to as “heritage bilinguals”. A heritage bilingual is defined as an individual who was “...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” (Valdés, 2000, p. 1). As implied by this definition, the language abilities of heritage bilinguals are variable, falling somewhere on a continuum of bilingualism (Valdés, 2005). A visual representation of this continuum is given below in Figure 1-1.

Figure 1-1: Continuum of bilingualism (reprinted from Valdés, 2005)



This continuum illustrates the ways in which a bilingual’s two languages may coexist in tandem; one end represents monolingualism in language “A”, and the other monolingualism in language “B”. The skills of heritage bilinguals fall somewhere between the two endpoints in accordance with the comparative dominance of each of their languages.

The language abilities of RHBs have been described in relation to this continuum as being “on the verge of culminating the language shift towards English monolingualism” (Beaudrie, 2009a, p. 86). What is meant by this is that RHBs are English-dominant and may be the last in their families to have enough linguistic knowledge to be able to function in Spanish (Beaudrie, 2006, 2009a; Kondo-Brown, 2005). These bilinguals typically have receptive skills that allow them to comprehend spoken Spanish, although they experience difficulty when speaking and have limited formal literacy (reading and writing) skills (Beaudrie, 2009a; Campbell & Rosenthal, 2000; Carreira, 2004; Chevalier, 2004; Kondo-Brown, 2006; Myers-Scotton, 2006; Montrul, 2010). Although anecdotal, when teaching courses for RHBs as a graduate student, my students often summarized in their own words the substantial asymmetry between their receptive and productive skills in Spanish, saying: “I understand everything you say, I just don’t speak it”.

Despite the profile of Spanish RHBs that has emerged in the literature, few studies have empirically tested the types of knowledge they have about their heritage language (see Au, Knightly, June & Oh, 2002; Au, Oh, Knightly, Sun & Romo, 2008; Beaudrie 2006, 2009a; Beaudrie & Ducar, 2005). More specifically, little is known about the nature of the linguistic system of RHBs, or how different types of grammatical knowledge may affect their ability to understand spoken Spanish. These unknowns are expressed in more detail in the statement of the problem, which immediately follows in Section 1.2.

1.2 Statement of the Problem

While Spanish RHBs report the ability to understand spoken Spanish despite limited production abilities and literacy skills, it is not currently clear what sorts of grammatical knowledge² they have in their heritage language. More specifically, it is not known how sensitive RHBs are to the well-formedness of morphology, or to what extent they are able to interpret the meaning supplied by nominal and verbal functional morphemes when listening to spoken Spanish (see Section 1.3 below for a brief summary of Spanish morphology, and Chapter 2 for a more detailed discussion). From a macro perspective, this research is concerned with the knowledge necessary to receptively know a language and the relationship between grammar and comprehension in receptive bilingualism. From a micro perspective, this study is concerned with the intuitions that Spanish RHBs have about the grammaticality of and meaning supplied by specific morphological structures which are “vulnerable” (Montrul, 2011, p. 98) in heritage language acquisition. By examining the morphological knowledge of RHBs in conjunction with measures of their overall proficiency and listening comprehension, the goal of this study is to further our understanding of the ways in which knowledge of structure and meaning develop in contexts of unbalanced bilingualism, and how they manifest themselves.

² In this study, “knowledge” is understood as access to the implicitly-known rules governing what is grammatical or well-formed in one’s language. This is often expressed as one’s “intuition” about the acceptability of a given structure or item. It does not refer to explicit or metalinguistic knowledge that may be acquired as a result of formal instruction in the language.

1.3 Conceptual Framework

Morphemes are the smallest meaning-bearing units in a language (Payne, 1997), often taking the form of prefixes or suffixes. Spanish is a highly-inflected language whose morphology is considerably more complex than that of English. In Spanish, articles, nouns, adjectives and pronouns are inflected for gender and number, and finite verbs carry inflectional morphemes for person and number, as well as tense, aspect and mood.

A growing body of research has shown that Spanish heritage bilinguals exhibit “persistent difficulty” (Bowles, 2011, p. 254) in relation to the production and interpretation of nominal and verbal inflectional morphology (Au et al., 2002, 2008; Beaudrie, 2006, 2009a; Martínez-Gibson, 2011; Miller & Cuza, 2013; Montrul, 2002, 2004, 2008, 2009, 2010; Montrul & Bowles, 2009; Montrul, Foote & Perpiñan, 2008; Silva-Corvalán, 1986, 1991, 1994, 2001). The reasons for this vulnerability are not entirely known, and various explanatory factors have been proposed which are typically attributed to processes of “attrition” or “incomplete acquisition”. These factors include the order in which a given morpheme is acquired in childhood in comparison to others, (Anderson, 1999a, 1999b, 2012; Montrul, 2002, 2008; Silva-Corvalán, 2003), frequency of use, (Anderson, 2012; Martínez-Mira, 2005), semantic relevancy of the morphological marker in question (Anderson, 1999b), interface vulnerability related to the complexity and semantic/syntactic function of a given structure (Anderson, 1999b; Bolonyai, 2007; Montrul, 2009), and whether exposure to English occurred sequentially or simultaneously with Spanish, which is often referred to as the ‘age of onset of bilingualism’ (Montrul, 2002, 2004b; Montrul & Potowski, 2007; Montrul et al., 2008).

General trends have emerged from previous studies indicating the following about the

morphological knowledge of heritage bilinguals: 1) these bilinguals have better command of morphological structures that are acquired earlier in childhood rather than later, 2) these bilinguals have more robust knowledge of morphology when exposure to English is sequential and delayed, and 3) heritage bilinguals have language skills which are better reflected by spoken tasks and those that tap automatized language processing, rather than by those requiring literacy skills or metalinguistic knowledge (Beaudrie, 2009a; Bolger & Zapata, 2011; Bowles, 2011; Kondo-Brown, 2005; Montrul, 2002, 2009; Montrul & Potowski, 2007; Montrul et al., 2008). As previously mentioned, the linguistic knowledge of heritage bilinguals is often framed in comparison to that of monolingually-raised (L1) speakers, and discrepancies between the two are generally categorized as evidence of incomplete acquisition or attrition in childhood (Anderson, 1999a, 1999b; Köpke & Schmid, 2007; Köpke, Schmid, & Keijzer, 2007; Montrul, 2008). Although it is difficult to disentangle whether the linguistic outcomes of heritage bilingualism are a result of attrition, incomplete acquisition, or some combination of the two (Anderson, 1999a, 1999b; Montrul, 2008; Silva-Corvalán 1994b, 2003, 2014), the mature state of heritage bilingual grammars is often referred to as “incomplete” in the sense that they differ from the competence of L1 speakers (Alarcón, 2011; Bolonyai, 2007; Jacobson, 2012; Montrul, 2008; Polinsky, 2006, 2008). However, the categorization of heritage grammars as incomplete has been questioned on descriptive, theoretical, and ideological grounds by a number of scholars, (Kupisch & Rothman, 2016; Otheguy, 2013; Pascual y Cabo & Rothman, 2012; Putnam & Sánchez, 2013). A more detailed discussion of the categorization of heritage language grammars as incomplete is given in Chapter 2.

Lastly, although a handful of studies has examined the grammatical and language

abilities of low-proficiency Spanish-English heritage bilinguals (Beaudrie, 2006, 2009a; Au et al., 2002, 2008), none has comprehensively studied Spanish RHB knowledge of functional morphology from an underlying competence and interpretation standpoint. In the remainder of this chapter I discuss the ways in which this study will help address this gap in the literature.

1.4 Purpose of the Study

The primary purpose of this study is to determine whether, and to what degree, knowledge of functional morphology is measureable in a population of Spanish RHBs by employing methodology suitable for their specific language abilities. As was mentioned above in Section 1.3, Spanish heritage bilinguals generally perform more accurately on oral tasks measuring grammatical knowledge than they do on tasks requiring reading, writing and metalinguistic knowledge. This suggests that certain task types may not accurately assess the underlying grammatical knowledge that heritage bilinguals have. The implications of these task effects are particularly important for Spanish RHBs, whose receptive language abilities are largely confined to the aural (listening) domain.

To address this methodological challenge a series of four experimental tasks, which are primarily aural in nature, were selected or developed for this study. One of these is an online (timed) psycholinguistic task that facilitates the analysis of participant behavior in reaction to stimuli as it occurs in “real time”. By including psycholinguistic methodology, it is possible to gauge participants’ mental representations of the language without relying solely on performance (accuracy) measures, which may mask evidence of underlying grammatical knowledge (Villegas, 2014). In this study the timed task, which measures how sensitive Spanish RHBs are to the grammaticality of functional morphemes, is complemented by three additional offline tasks that

evaluate proficiency, listening comprehension abilities, and the ability to interpret morphemes for meaning. Each of these tasks, as well as measures of the relationships between them, is intended to answer one of the research questions. These questions are outlined along with the hypotheses in the following section.

1.5 Research Questions, Hypotheses and Experimental Design

1.5.1 Research questions

This study is guided by the following six research questions:

Research Question 1: How accurately are Spanish RHBs able to extract meaning from aurally presented, conversational Spanish?

Research Question 2: How do Spanish RHBs perform on an aural task measuring global Spanish language proficiency?

Research Question 3: Are Spanish RHBs sensitive to morphosyntactic well-formedness in spoken Spanish, and to what degree?

- a. How does sensitivity to grammaticality vary between morpheme conditions?
- b. What might account for variation between morpheme conditions?

Research Question 4: Do Spanish RHBs extract meaning from bound morphemes in spoken Spanish?

- a. How does the ability to interpret morphemes for meaning vary across morpheme conditions?
- b. What might account for variation between morpheme conditions?

Research Question 5: What do correlations between the experimental tasks suggest about the interrelatedness of the skills and knowledge that they evaluate?

Research Question 6: What characterizations of heritage language grammars best represent the language skills of Spanish RHBs?

1.5.2 Hypotheses

The first and second questions are related to the global language abilities of Spanish RHBs, and how well they function in the language as receptive bilinguals. While their abilities are anticipated to fall on the lower range of the proficiency scale (Beaudrie, 2009a, 2011; Montrul, 2009), they are nevertheless expected to exhibit a good understanding of spoken Spanish (Beaudrie, 2009a).

Questions 3 and 4 are related to the vulnerability of morphosyntactic development in heritage language acquisition. While the linguistic systems of RHBs are expected to differ from those of more proficient heritage bilinguals, they are nevertheless expected to show a degree of underlying morphosyntactic competence and the ability to process morphemes for meaning when listening to spoken Spanish (Au et al., 2002, 2008; Sherkina-Lieber, 2011; Sherkina-Lieber, Perez-Leroux & Johns, 2011). The knowledge of forms that were acquired earlier in childhood is expected to be more robust than that of morphemes acquired later (Anderson, 1999a, 1999b, 2012; Montrul et al., 2008), and RHBs are predicted to experience more processing and comprehension difficulties for those structures that stabilize after the onset of formal schooling in English, which occurs at approximately the age of 5 in the US. Additionally, structures whose

function is semantic (e.g. aspect or mood morphology) rather than syntactic (e.g. gender agreement morphology), and that also stabilize after the age at which formal education commences, are predicted to be especially affected (e.g. aspect and mood morphemes). The rationale for this prediction is based on the following: 1) the semantic properties of aspect and mood may be more complex in comparison to those of the other morphological structures tested, 2) the acquisition of these morphemes may be constrained by cognitive development, and 3) the timeline during which these morphemes develop is punctuated by a shift in language dominance due to the onset of formal schooling in English (Martínez-Mira, 2005; Montrul, 2008, 2009; Pérez-Leroux, 1998).

Research questions 5 and 6 are exploratory, as currently very little is known about how the grammatical knowledge of RHBs might correlate with tasks that evaluate more global language skills. In relation to question 5 specifically, a linear relationship is expected between all the experimental tasks in the study (Sherkina-Lieber, 2011), however no specific predictions are made about what the relative strengths of those relationships might be, or what they might suggest about the linguistic abilities of RHBs. In regards to research question 6, it is expected that the results of this study will support arguments characterizing heritage grammars as complete linguistic systems in their own right, rather than as “incomplete” versions of a monolingual variety (Beaudrie, 2009b; Martínez, 2009; Otheguy, 2016; Pascual y Cabo & Rothman, 2012; Putnam & Sanchez, 2013; Valdés, 2000, 2005).

1.5.3 Experimental design

The experimental tasks and analyses conducted in this study are presented below in conjunction with the research question they address:

1. An aurally-presented contextualized listening comprehension task is used to examine the listening comprehension abilities of RHBs, and to answer research question 1.
2. An elicited imitation task is used measure RHB proficiency and to answer research question 2.
3. An aural, self-paced grammaticality judgment task (GJT) is used to determine whether RHBs have access to the rules that govern the grammaticality of nominal and verbal functional morphology in Spanish, and to answer research question 3.
4. A morpheme comprehension task is used to evaluate whether RHBs can access the meaning provided by morphemes when listening to spoken Spanish, and addresses research question 4.
5. Research question 5 is addressed by testing the comparative strength and direction of the correlations between the experimental tasks.
6. Research question 6 is addressed by contrasting the overall picture that emerges of the abilities of Spanish RHBs with the descriptions, theories and hypotheses that have been used previously to classify and account for heritage grammars.

1.6 Contribution of the Study

To date, research on the linguistic systems of Spanish RHBs is limited (Beaudrie, 2006,

2009a; Au et al., 2002, 2008), as are studies employing psycholinguistic methods to examine the underlying competence of heritage bilinguals (see Sherkina-Lieber's 2011 study of the abilities of Labrador-Inuttitut receptive bilinguals, and Villegas' 2014 study of the grammatical abilities of advanced Spanish-English heritage bilinguals). This dissertation therefore seeks to address both of these areas of opportunity in the literature, and to contribute to the existing knowledge about heritage grammars in the following three ways:

1) This study provides additional information about how the linguistic outcomes of heritage language acquisition in childhood subsequently manifest themselves in adulthood. This is accomplished by examining the knowledge of area of grammar known to be especially affected in Spanish heritage language acquisition, in an understudied population of receptive heritage bilinguals. By testing the implicit knowledge that Spanish RHBs have about morphological well-formedness as well as their access to the meaning supplied by morphemes, this study provides a window into the role that the vulnerability of the syntax/semantics interface may play in the way morphological knowledge develops in heritage bilinguals (Montrul, 2008; Sorace, 2000; Tsimpli & Sorace, 2006).

2) The second contribution of this research is that it addresses the limited number of studies in the field of Spanish heritage bilingualism that have utilized psycholinguistic tasks to assess underlying grammatical knowledge and processing (see Bolger & Zapata, 2011, for a review). Specifically, a timed psycholinguistic task is included to provide a measure of grammatical competence that may not be revealed by other performance data (Villegas, 2011). Additionally,

the research methods in this study have been designed to circumvent the problematic nature of using written or reading tasks to assess the skills of a population with low levels of literacy. As a result, all the experimental tasks utilize stimuli that is presented entirely aurally.

3). Lastly, this study helps inform theories of bilingualism, heritage language pedagogical practices, and Spanish language maintenance and revitalization efforts in the US. Demographic trends indicate that as the birthrate of US-born Latinos outpaces the rate of foreign immigration, the linguistic consequence will be an increase in future generations of bilinguals with limited and variable knowledge of their heritage language (Carreira, 2003). As enrollment in higher education and university language courses also continues to increase for US Latinos, it is important to understand the specific competencies that these bilinguals bring to the language classroom as well as what their particular strengths and learning needs might be.

1.7 Overview of the Dissertation

The remainder of this dissertation is structured as follows. In Chapter 2, I review the relevant literature. First I define key terms and discuss the state of Spanish as a heritage language in the US. I follow this with a discussion of morphological structure in Spanish and how it develops in childhood. I then summarize the literature on the grammars of adult heritage bilinguals, as well as the different theories put forth to account for incomplete acquisition and attrition as they relate to unbalanced bilingualism. I close by giving an overview of what is known about Spanish receptive bilingualism.

In Chapter 3, I describe the research methodology utilized in this study. This includes the

recruitment and selection of subjects followed by a description and rationale for the different experimental tasks used. I describe the nature of each task how the various instruments were chosen or developed, including the specific items they employ. I also summarize the testing protocol for each participant and conclude with an overview of how the data was coded and statistically analyzed.

In Chapter 4, I present the analyses of each of the experimental tasks and a summary of their findings. This chapter begins with a detailed description of the language history of the participants followed by a description of the results organized by research question and task. Lastly, correlations are examined between the different tasks and potential explanations for their varying strengths are discussed.

In Chapter 5, I provide a broad overview of the results of the study in relation to the research questions and hypotheses. The findings of this study are situated alongside prevailing theories and hypotheses regarding bilingual grammars, and I suggest how the linguistic systems of RHBs should be categorized as a result. I also mention some limitations of this research and suggest avenues for future inquiry. I conclude this chapter with some final thoughts on the implications of these findings for heritage language pedagogical practices and language maintenance.

CHAPTER 2 – REVIEW OF THE LITERATURE

2.1 Introduction

In this chapter I provide a comprehensive summary of the literature related to the morphological knowledge of heritage bilinguals. This review includes what is known about morphosyntactic development in monolingual and bilingual children, how morphological knowledge has been measured in adult heritage bilinguals, and the principal theories put forth to explain the patterns of grammatical knowledge that bilinguals have in their heritage language. I begin by defining key terms that are used throughout this study and then summarize Spanish morphology and its acquisition and development in childhood. Next I review what is known about how the grammatical skills of adult heritage bilinguals have been evaluated and characterized, paying special attention to various methodological considerations related to the study of heritage grammars. This is followed by a description of the theories and hypotheses put forth to account for the linguistic outcomes of heritage bilingualism. I close this chapter with a review of what is currently known about the profiles language abilities of Spanish RHBs.

2.2 Definition of Key Terms

Considerable variation can be found in the definitions of terms related to the study of languages and linguistics and they are ever-evolving over both time and areas of inquiry. The purpose of this section is therefore to define various terms as they are used in this study.

2.2.1 Competence, performance and proficiency

Of all the terms discussed in this section, definitions of competence, performance, and proficiency may be the most varied and contentious in the literature (see Brown, Malmkjær, & Williams, 1996, for a thorough discussion of competence and proficiency). At the heart of the dialog surrounding these terms lie larger questions regarding how underlying linguistic knowledge is manifested in various domains of language use, as well as the ways in which grammatical competencies can be best measured (Brown et al., 1996). Seminal contributions to the understanding of these terms harken back to Chomsky and Saussure's classic distinctions between 'competence' and 'performance' (Chomsky, 1965) and 'langue' and 'parole' (Saussure, 1916). While an in-depth discussion of the critiques levied against the early interpretation of these terms is beyond the scope of this literature review, suffice it to say that it is generally accepted currently that competence and performance refer to distinct but interrelated aspects of language knowledge and use. For the purposes of this study, competence performance and proficiency as defined as follows:

Competence

The notion of competence has perhaps caused the most controversy and confusion in the fields of language learning and linguistics (Taylor, 1988). The concept as introduced by Chomsky in 1965 is not evaluative and does not refer to the abilities an individual has in a language. Rather, competence is conceived as the "intrinsic, tacit knowledge" that underlies the ability of a speaker to use a language in various ways (Chomsky, 1965, p. 40; Taylor, 1988). (Other prevalent characterizations of competence refer to the measureable degree of ability with

which a speaker can use or manipulate certain domains of a language in certain contexts. These include, for example, lexical, communicative or pragmatic competence.) Competence, therefore, is a “[rule-governed] system of generative processes” (Chomsky, 1965: 4), which is characterized by the “grammar” of an individual. An individual’s grammar is understood to be the mental representation of the set of rules that enable an individual to determine whether an utterance is acceptable or not (Taylor, 1988). For the purposes of this study, linguistic competence is defined in the following way:

"Linguistic competence constitutes knowledge of language, but that knowledge is tacit, implicit. This means that people do not have conscious access to the principles and rules that govern the combination of sounds, words, and sentences; however, they do recognize when those rules and principles have been violated ... For example, when a person judges that the sentence ‘John said that Jane helped himself’ is ungrammatical, it is because the person has tacit knowledge of the grammatical principle that reflexive pronouns must refer to an NP in the same clause" (Cairns, 2010).

In this study, the terms ‘(underlying) competence’, ‘grammar’, and ‘linguistic system’ will be used interchangeably to refer to the underlying knowledge an individual has about structure and meaning in a language.

Performance

While competence is understood as a ‘state’ or what is intuitively known about a language, performance refers to the actual process of “use of the language in concrete situations” (Chomsky, 1965, p. 4). Performance is defined as the observable and measurable realization of

an individual's underlying competence or unseen potential in the language. Performance can refer to a speaker's oral production as well as their comprehension abilities and literacy skills. While an individual's ability to speak, read, write, or comprehend a language is dependent upon their underlying competence, linguistic performance is not always an accurate reflection of the latter. For example, in the event of a slip-of-the-tongue speech error (Fromkin, 1973) the speaker ostensibly knows that they have made a mistake. This error is not reflective of the speaker's underlying linguistic system, but is instead the result of extralinguistic influences on their performance such as fatigue or distractions.

Proficiency

Linguistic proficiency differs from both competence and performance and refers to the spectrum of abilities that one has in any given domain of a language (speaking, reading, writing, lexical, grammatical, etc.). The American Council on the Teaching of Foreign Languages (ACTFL) defines proficiency, or more precisely the guidelines by which proficiency is evaluated, as "... a description of what individuals can do with language in terms of speaking, writing, listening, and reading in real-world situations in a spontaneous and non-rehearsed context" (taken from the ACTFL proficiency guidelines found at www.actfl.org). While methods of measuring proficiency and the terms used to refer to specific skill levels are numerous, proficiency is generally represented by a continuum ranging from low, beginning or elementary on one end, to native or expert speaker on the other end.

2.2.2 Heritage language

A heritage language in its most broad sense is a non-dominant language which has personal relevance to an individual (Fishman, 2001). Fishman describes heritage languages in the US as non-English languages which typically fall into one of three categories:

1. Colonial heritage languages, spoken by the first European colonizers in what now is the US,
2. Immigrant heritage languages, spoken by those who immigrated to the US after it was established as an independent country, and
3. Indigenous heritage languages, spoken by the peoples native to the Americas.

It could be argued that Spanish transcends each of these three categories, as it has historically been spoken by colonists, immigrants, and those indigenous to what is now the US alike. For the purposes of this study Spanish is considered to be an individual's heritage language insofar as that individual was exposed to it and acquired it to some degree during childhood via naturalistic input through a personal, familial or community connection (Fishman, 2001; Beaudrie & Fairclough, 2012; Valdés, 2000). Importantly, what characterizes Spanish heritage bilingualism in the US in comparison to other types of bilingualism is that the use of and exposure to Spanish occur in the home and in the community, although bilinguals are formally educated in English beginning at approximately the age of 5.

2.2.3 Heritage language bilingual / learner

Definitions of heritage language bilinguals are varied and connote diverse patterns of language socialization, connections to the heritage language and culture, proficiencies, and motivations. On one hand, “broad” definitions (Carreira & Kagan, 2011, p. 4) include “learners with a heritage motivation” (Van Deusen-Scholl, 2003, p. 222) who have cultural ties to the heritage language through family or community, but who may not be at all proficient in the language. On the other hand, “narrow” definitions describe individuals with some element of proficiency in the heritage language (Carreira & Kagan, 2011, p. 4). Because this study is concerned with measuring the linguistic abilities of Spanish RHBs, the definition used to describe this population must reflect that they have, at a minimum, receptive abilities in the heritage language. To that end and as was previously cited in Chapter 1, a heritage language bilingual is defined in this study as an individual 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” (Valdés, 2000, p. 1).

Heritage bilinguals may alternately be referred to as heritage language learners depending on the role that formal education plays in the language learning process. While both types of bilinguals have clearly acquired the heritage language to some degree and on the surface the two terms may seem to be interchangeable, a heritage language learner is an individual who receives instruction on their heritage language in a formal educational context (Valdés, 2000). As these definitions relate to the current study, not all individuals who participated were technically “learners” as not all were enrolled in Spanish courses at the time of data collection. Therefore,

the term “heritage language bilingual” is used to refer to all Spanish HRB participants in order to avoid confusion regarding their profiles.

2.2.4 Receptive bilingualism

Receptive bilingualism is characterized by an individual’s ability to understand but not speak a second language (Döpke, 1992). Studies on receptive bilingualism have focused on two primary types which differ due to the characteristics of and relationship between the two languages in question. In one type, the ability to understand another language is inherited in the sense that the individual’s L1 is mutually intelligible with the L2 to an extent. This type of receptive bilingualism is defined as “a mode of multilingual communication in which interactants employ a language and/or a language variety different from their partner’s and still understand each other without the help of any additional lingua franca” (Rehbein, ten Thije & Verschik, 2012, p. 248). This mutual intelligibility is a result of similarities between the two languages themselves, and is not due to typical L1 or L2 acquisition processes. Studies of this type of receptive bilingualism generally focus on pairs of European languages that are in contact due to geographic, political or economic reasons (see Schüppert & Gooskens’ 2012 study of receptive bilingualism between Danish and Swedish).

The second type of receptive bilingualism, which is the focus of this study, is a result of exposure to and acquisition of two languages that may or may not be related, and which are in a relationship of greater dominance (the majority language) and lesser dominance (the heritage language) to one another. The unbalanced bilingualism that emerges as a result is characterized by asymmetry between the receptive and productive skills that one has in the heritage language,

and this asymmetry may be considerable. While both types of receptive bilingualism converge in that learners generally comprehend oral language while possessing minimal literacy skills and speech production abilities, (Beaudrie, 2009a, Sherkina-Lieber, 2011), the linguistic knowledge of receptive bilinguals who have actually acquired the receptively known language differ. For example, Basham and Fathman's (2008) definition of 'latent' bilinguals includes references to the knowledge and skills that receptive bilinguals typically possess which stem from processes of acquisition. More specifically, the authors state that, "their receptive skills surpass productive skills, they remember common expressions and emotion-laden vocabulary and their productive phonology is advanced" (p. 577).

2.3 Heritage Spanish Bilingualism in the US

Heritage language education and research began to gain momentum alongside the *movimiento chicano* civil rights movement of the '60's and '70's, and helped pave the way for increasing numbers of Mexican American students to enroll in US colleges and universities (Martínez, 2003). The focus of early heritage language advocates such as Guadalupe Valdés and the American Association of Teachers of Spanish and Portuguese (AATSP), was working to legitimize the dialects and address the affective and educational needs that this new population of language learners brought to college and university language classrooms. These students often spoke home dialects that differed from monolingual varieties promoted both by teachers and the pedagogical resources available at the time. As a result, their Spanish was often implicitly or explicitly devalued (Valdés, 1981, 1995, 1997). Guadalupe Valdés published seminal works in 1978 and 1981, which called into question practices of subtractive bilingualism and the "ranging

contradictions and insensitivities” (Martínez, 2003, p. 1) that were pervasive in Spanish language education at the time. One of Valdés’ early contributions was introducing the notion of additive bidialectism, in which a learner’s home or community variety is maintained alongside the acquisition of a standard or prestige variety. Valdés (1997) identified the profiles of eight different types of heritage bilinguals who were enrolling in university Spanish courses at the time. These included, on the most proficient end of the spectrum, newly arrived immigrants with formal schooling in a prestige variety of Spanish. Individuals at the other end of the spectrum included those with only receptive abilities in a contact variety of Spanish and no formal academic language skills. While this spectrum encompasses a wide range of language abilities, most of the heritage bilinguals enrolling in courses were productive speakers of a rural or stigmatized variety of Spanish who had limited literacy skills in the language. Valdés therefore encouraged the “development and enrichment of language skills within existing dialects” in order to promote “wider communicative competence and enhancement of self- image” (1981, p. 19).

Since then, increasing numbers of Spanish heritage bilinguals enrolling in schools and universities have coincided with demographic shifts that have altered learner profiles. As a result, observed patterns of Spanish shift and loss in the US due to the influence of English have prompted researchers to add the goal of language maintenance to other goals of heritage language education (Valdés, 2000). On one hand, the significant and established populations of Latinos within the US have undoubtedly privileged the maintenance of Spanish in comparison to other minority languages. According to 2010 Census data, the Hispanic population in the United States had surpassed 50 million and in seven states, Hispanics constitute more than 20% of the

total population (ranging from 20.7% in Colorado to 46.3% in New Mexico). However, on the other hand, Beaudrie (2011) cautions against the conclusion that a large Hispanic presence is solely responsible for language maintenance and suggests that a continuous influx of foreign-born immigrants is also partially responsible. Carreira (2003) notes that Spanish language use is one of the most crucial uniting factors within a population that is otherwise very diverse. She underscores the importance of promoting Spanish use and maintenance, stating that beyond language, “there is little beyond a few scattered cultural notions that serve to unite the various groups that currently fall under the umbrella of U.S. Hispanics or Latinos” (p. 424). Considering the goals of Spanish heritage language education alongside demographic trends emphasizes the importance of carefully studying and understanding the profiles, language skills, and pedagogical needs of heritage bilinguals so that the vitality of Spanish use in the US may be preserved.

Turning now to what is known about the specific language skills of Spanish heritage bilinguals, their descriptive profiles both share aspects with and diverge from those of other speakers, such as L1 speakers and L2 learners (Montrul et al., 2008). Like L1 speakers, Spanish heritage bilinguals possess language skills and cultural knowledge that have their roots in a home community (Carreira & Kagan, 2011). Spanish heritage bilinguals and L1 speakers both acquired Spanish during childhood, but the input that heritage bilinguals receive may be more variable in frequency and type depending on language socialization dynamics (Montrul et al., 2008; Alarcón, 2010). As a result, the development of some aspects of their language skills, such as phonology, may virtually mirror the abilities of monolingual speakers (Au et al., 2002, 2008). On the other hand, aspects such as morphosyntax may be shaped by processes of “attrition” or “incomplete acquisition”(Alarcón, 2011; Anderson, 1999b; Cuza, 2002; Köpke & Schmid, 2004;

Montrul, 2008). These processes are often subsumed under the umbrella term of “incomplete acquisition,” which references the differences between the end state of heritage grammars and those of monolingual varieties (Montrul, 2008). In comparison to L2 learners, heritage bilinguals may be more affected by variables such as motivation, linguistic identity and other affective factors than are monolingual speakers (Montrul et al., 2008, p. 506). Also, heritage bilinguals may have comparatively limited literacy but more advanced oral skills than L2 learners, while L2 learners have primarily received their schooling in formal, academic contexts and typically have more advanced metalinguistic knowledge (Montrul, 2012a).

Heritage bilinguals exhibit a greater deal of heterogeneity in their language skills than do L1 or L2 speakers (Kanno, Hasegawa, Ikeda, Ito, & Long, 2008; Kondo-Brown, 2005; Valdés, 1995). As mentioned, some aspects of their proficiency may be quite advanced, such as phonology (Au et al., 2002, 2008) or knowledge of lexical items related to the home and community (Basham & Fatham, 2008). The acquisition of other aspects, for example morphosyntax, might be more vulnerable in childhood acquisition (Montrul, 2008). Beaudrie (2011) describes the continuum of proficiency found in heritage bilingual populations in the following way: “The starting point of the continuum is receptive learners, who have some knowledge of the language, mostly passive, but are beyond a beginning level of language proficiency (i.e., no prior knowledge of the language). At the midpoint are learners with developing proficiency, who due either to incomplete acquisition or language loss have gaps in their language competence that need to be filled. Toward the upper end of the continuum are learners who are fluent in the heritage language but may not have a good command of different registers or varieties of that language” (p. 333). A learner’s needs, depending on where they fall

on the continuums of proficiency and bilingualism, may therefore necessitate teaching methods that range from those supporting (re)acquisition in the case of the least proficient learners, and/or language maintenance for more proficient learners (Valdés, 1997). Overall, the picture that emerges of Spanish heritage bilinguals' language development and abilities is a complex one, dependent on multiple variables (Colombi & Roca, 2003).

2.4 Spanish Morphology and Childhood Acquisition

Spanish is an inflectional language in which morphological suffixes provide information about grammatical gender and number in the case of nouns, as well as conjugation class, person, number, tense, aspect, and mood in the case of verbs. Morphemes, the smallest segmentable units with lexical content, are combined with word roots and theme vowels to produce what is commonly referred to as a "word". What follows is a theoretical description of morphological structure in Spanish as it relates to the five morpheme classes tested in this study. The morpheme classes were chosen for this study those typically taught in a first-semester Spanish for heritage learners course (Beaudrie, 2006).

Much of what is known about the grammatical systems and morphosyntactic knowledge of Spanish heritage bilinguals comes from studies of these individuals as adults once they have enrolled in a university setting. Attempts to trace the development of their language systems from childhood to adulthood, or to determine the effect that processes such as attrition, incomplete acquisition or language contact might have on their grammars, are difficult to surmise given the absence of long-term longitudinal studies. That said, knowledge of patterns of morphosyntactic acquisition in childhood may help explain the linguistic abilities of similar

populations as adults. In light of this, the ages at which various morphological structures tested in this study emerge and stabilize in monolingual and bilingual children is summarized below.

2.4.1 Gender agreement / assignment

Spanish nouns are inflected for grammatical gender, which is either masculine or feminine. Gender assignment at the noun level is lexical, and gender agreement is syntactic as there must be agreement between the noun, determiner and adjective within a noun or verb phrase. Nouns are comprised of roots and theme vowels, the latter of which typically relegate them to one of three inflectional classes: 1) [-a] theme vowels correspond to feminine stems, 2) [-o] theme vowels to masculine, and 3) the grammatical gender of nouns ending in [-e] or a consonant is signaled by their modifiers, such as definite or indefinite articles in the cases of *el coche* ‘the_{masc} car’ or *una pared* ‘a_{fem} wall’. In some instances, the gender of a noun correlates to its real world referent and its grammatical gender is reflected by the determiner, such as in the case of *el hombre* ‘the man’ and *la mujer* ‘the woman’. Other animate nouns referring to people have inflectional morphemes that alternate between [-o] and [-a] in accordance with the biological gender of the person, for example *el chico* ‘the boy’ versus *la chica* ‘the girl’. Some nouns are comprised of a root and a derivational morpheme, which associate them with either masculine or feminine gender. For example, those ending in [-ción], [-sión], [-tad], or [-dad] are feminine (*la canción* ‘the song’), while those ending in [-z],[-n], or [-r] are typically masculine (*el pez* ‘the fish’ or *el algodón* ‘the cotton’). There are a number of exceptions to these rules, such as words of Greek origin (*el problema* ‘the problem’), and common nouns ending in [-o] or [-a] (particularly referring to professions) in which the lexical/biological gender is reflected

through the determiner (*el poeta* ‘the_{masc} poet’ versus *la poeta* ‘the_{fem} poet’). Examples (1a) and (1b) show agreement in the noun phrase for prototypical [-a] feminine-ending nouns and [-o] masculine-ending nouns, in which determiners and adjectives with gender morphemes must agree with the noun. Examples (2a) and (2b) illustrate agreement in the verb phrase.

- | | | | | |
|-----|----|---------------------------|-----------------------------------|---|
| (1) | a. | La (the _{fem}) | casa (house _{fem}) | roja (red _{fem}) ³ |
| | b. | El (the _{masc}) | auto (car _{masc}) | rojo (red _{masc}) |
| (2) | a. | La (the _{fem}) | máquina (machine _{fem}) | está rota (is broken _{fem}) |
| | b. | El (the _{masc}) | piso (floor _{masc}) | parece mojado (seems wet _{masc}). |

In monolingual children, evidence of the acquisition of gender agreement begins at a very young age (as early as 17 or 18 months) and is fully mastered by the age of 3 or 4 years. Masculine forms are acquired earlier, with feminine and irregular forms trailing behind, and determiners are acquired before adjectives. Once a monolingual child acquires gender agreement, they produce it with 100% accuracy (Montrul, 2004, p. 61). Bilingual children show a similar trajectory in both the age at which gender agreement emerges and in the order in which determiners and adjectives emerge. However, unlike monolingual children, errors in gender agreement do not disappear by the age of 3 or 4, and persist into the grade school years (Montrul et al., 2008).

Gender agreement has also been shown to be susceptible to attrition when there is a shift in language dominance in childhood, even when its use had previously stabilized. In Anderson’s

³ Examples adapted from Montrul et al., 2008

(1999a, 1999b) longitudinal studies, the results showed evidence of a decrease in gender agreement accuracy in two children that occurred as a result of a move from Puerto Rico to the US. The grammatical system of the younger sibling (who was approximately a year and a half at the time of the move) was particularly affected, suggesting that the earlier a shift in dominance the majority language occurs, the more the grammar of the heritage language will be affected.

2.4.2 Subject/Verb agreement

In Spanish, verbs are inflected for grammatical person, number, tense, aspect, and mood. Inflectional suffixes affix to verbs stems which are comprised of roots and theme vowels. The suffixes typically belong to one of three inflectional classes which are determined by the respective thematic vowel of the infinitive ending of the verb. The exact structure of the affix varies depending on whether the theme vowel is an [-a], [-e], or [-i]. An example of the marking for grammatical person (1st person plural) is illustrated in example (3) below, for a finite form of the verb *cantar* ‘to sing’.

(3) *cant* (sing) *a* (theme vowel) *mos* (present indicative, 1st person plural)

Focusing just on subject/verb person and number agreement, Spanish verbs are marked for both grammatical person (1st, 2nd and 3rd) and number (singular and plural), and both person and number must agree with that of the subject. Although Spanish is a pro-drop language, in which subject pronouns may be omitted when they are pragmatically inferable from the context, the verb still agrees in person and number with the null subject pronoun. The following table

shows model paradigms for present indicative verbs for all grammatical persons in each of the three inflectional classes:

Table 2-1: Model paradigms for grammatical person and number agreement – Spanish present tense verbs

Subject pronoun [inflectional class]	Verb paradigm		
	[-ar]	[-er]	[-ir]
(Singular) yo	canto	como	vivo
tú	cantas	comes	vives
él/ella/Ud.	canta	come	vive
(Plural) nosotros/nosotras	cantamos	comemos	vivimos
vosotros	cantáis	coméis	vivís
ellos/ellas/Uds.	cantan	comen	viven

In monolingual children whose Spanish is developing normally, verbal inflection appears alongside the very earliest use of verbs before the age of 2 years (Bel, 2001; Mueller, Gathercole, Sebastián & Soto, 1999). While overgeneralization from regular to irregular forms does occur, children show almost perfect command of verbal morphology (of the verbs they produce) around the age of 3 (Clahsen, Aveledo & Roca, 2002).

Subject/verb agreement emerges in both monolingual and bilingual children at an early age. Studies have shown agreement in monolingual children emerges as early as 19 months (Bel, 2001), and in bilingual children (Spanish-Basque) as early as 2 years (Austin, 2001). In monolingual children, 1st and 3rd- person plural forms emerge first, although some children do

show early contrasts of 1st, 2nd and 3rd person (Bel, 2001; Anderson, 2001). As far as frequency of the forms is concerned, 2nd-person plural is the form least frequently produced in early childhood, and the most frequent are 1st person plural followed by 3rd – person plural (Bel, 2001; Anderson, 1999b, 2001). Similar to gender agreement discussed previously, verb agreement also seems to be susceptible to language attrition in bilingual children. In Anderson’s 1999a and 1999b longitudinal studies which tracked the language development of two bilingual children over two years, errors in verbal agreement increased between the first and last time the children’s production was evaluated. These rates increased from 2.3% to 5% for the older child, and from 3.8% to 13.9% for the younger child. The most frequent subject/verb agreement error was that the children used 3rd person singular forms in place of those for 1st person singular.

2.4.3 Tense

Spanish distinguishes between the present, past, and future tense and all tenses have distinct morphological affixes. As was previously discussed in relation to subject/verb agreement, the structure of the affix is dependent on the theme vowel of the verb. The following table shows model paradigms for three regular verbs in both the present and preterit tense.

Table 2-2: Model paradigms for the present and preterit tense of regular Spanish verbs

Subject pronoun [inflectional class]	Verb paradigm [-ar] present		[-er] present		[-ir] present	
		preterit		preterit		preterit
(Singular) yo	canto	canté	como	comí	vivo	viví

tú	cantas	cantaste	comes	comíste	vives	viviste
él/ella/Ud.	canta	cantó	come	comió	vive	vivió
(Plural)						
nosotros/nosotras	cantamos	cantamos	comemeos	comimos	vivimos	vivimos
vosotros	cantáis	cantasteis	coméis	comisteis	vivís	vivisteis
ellos/ellas/Uds.	cantan	cantaron	comen	comieron	viven	vivieron

Monolingual children mark the past tense at as early as 2 years of age and past tense morphology emerges simultaneously or soon after the present tense (Bel, 2001). Tense morphology stabilizes around the age of three for monolingual children (Clahsen et al., 2002). Initially, the past tense is marked solely with the preterit (Montrul, 2004a, p. 122). Despite a preference for the present tense, Bel (2001) found that children did not overgeneralize their use of it; present tense forms were only used to talk about actions that were clearly in the present or ongoing. In bilingual Spanish-Basque children, the emergence of the past tense lags slightly behind that of the present tense (Ezeizabarrena, 1997). Cuza, Pérez-Tattam, Barajas, Miller, & Sadowski (2013) found in their study of tense and aspect acquisition that older bilingual children (8-9 years old) produce more instances of the preterit tense than do younger bilinguals (5-7 years), and adult heritage bilinguals overgeneralize the use of the preterit tense more than the children do.

(6) Cuando *era* niña me *gustaba* jugar con muñecas habitual
 ‘When I was (imperf) a little girl I liked to play with dolls’

(7) Los dinosaurios *ponían* huevos generic
 ‘Dinosaurs laid (imperf) eggs’

The following table shows model paradigms for the preterit and imperfect aspect by inflectional class.

Table 2-3: Model paradigms for the preterit versus imperfect tense-aspect of regular Spanish verbs

Subject pronoun [inflectional class]	Verb paradigm [-ar] preterit	imperfect	[-er] preterit	imperfect	[-ir] preterit	imperfect
(Singular) yo	canté	cantaba	comí	comía	viví	vivía
tú	cantaste	cantabas	comíste	comías	viviste	vivías
él/ella/Ud.	cantó	cantaba	comió	comía	vivió	vivía
(Plural)						
nosotros/nosotras	cantamos	cantábamos	comimos	comíamos	vivimos	vivíamos
vosotros	cantasteis	cantabais	comisteis	comíais	vivisteis	vivíais
ellos/ellas/Uds.	cantaron	cantaban	comieron	comían	vivieron	vivían

Aspectual distinctions between the preterit and the imperfect are acquired later in childhood than are the grammatical constructs previously discussed. In Fernández-Martínez’s 1994 longitudinal study of a monolingual Spanish-speaking child, preterit and imperfect distinctions did not emerge until 34 months of age. While Hodgson’s 2005 survey of children

learning Spanish in Barcelona found that children as young as 3-4 were actively using the imperfect, their use was variable. Among three experimental groups divided by age, only the oldest childhood group (7-8 years old) showed target-like use of the preterit and imperfect. Additionally, using a comprehension task, Hodgson found that at the ages of 3-4 children do not grasp the semantics of preterit/imperfect distinctions but at the age of 7-8 their comprehension is adult-like. In Silva-Corvalán's 2003 study of bilingual pre-school children in Los Angeles, she found that the earlier children had been exposed to English, the more difficulty they experienced with preterit/imperfect distinctions.

2.4.5 Mood

Spanish expresses modality via affixes on the verb, and distinguishes between the indicative, subjunctive and imperative mood. The following table shows model paradigms for present-tense verbs in the indicative and subjunctive mood.

Table 2-4: Model paradigms for the present-tense indicative versus subjunctive mood of regular Spanish verbs

Subject pronoun [inflectional class]	Verb paradigm [-ar] indic		[-er] indic		[-ir] indic	
		subj		subj		subj
(Singular) yo	canto	cante	como	coma	vivo	viva
tú	cantas	cantes	comes	comas	vives	vivas
él/ella/Ud.	canta	cante	come	coma	vive	viva
(Plural)						
nosotros/nosotras	cantamos	cantemos	comemos	comamos	vivimos	vivamos

vosotros	cantáis	cantéis	coméis	comáis	vivís	viváis
ellos/ellas/Uds	cantan	canten	comen	coman	viven	vivan

While the indicative mood is used to refer to a reality, use of the subjunctive “signals a hypothesis or something that is not yet a real fact [and] it is also found in a number of contexts where the subjunctive standpoint of the speaker matters more than the objective reality” (Pérez, Sala & Santamarina, 1993, p. 102). This distinction is often referred to as realis/irrealis opposition. In this study, the subjunctive is tested in two different contexts. The first is the context of doubt versus certainty, and the second is in situations that refer to definite or known antecedents versus indefinite or unknown antecedents. In the case of expressions of doubt, the verb carrying the mood morpheme appears in the subordinate clause and is lexically selected by the verb. In the case of known/versus unknown antecedents, the verb carrying the mood morpheme also appears in the embedded clause, and mood is determined by the semantic context. Examples (8) and (9)⁵ illustrate these two contexts:

- | | |
|---|---|
| (8) Creo que *sea/es verdad
'I believe that it *is _{subj} /is _{indic} true | doubt vs. certainty
(obligatory indicative) |
| (9) Busco un estudiante que hable/habla japonés | known vs. unknown antecedent
(indicative or subjunctive) |
- I'm looking for a student that speaks_{ind}/speaks_{subj} Japanese

⁵ Adapted from Montrul et al., 2008

Use of the subjunctive mood emerges in monolingual children by the age of two (Aguirre, 2000; López Ornat, Fernández, Gallo & Mariscal, 1994), although mood distinctions are one of the last to be acquired by both monolingual and bilingual children (Blake, 1983; Hernández-Pina, 1984; López Ornat et al., 1994; Martínez-Mira, 2005, 2009; Pérez-Leroux, 1998; Silva-Corvalán, 2003). In monolinguals the subjunctive appears first in the imperative form and extends soon after to adverbial clauses that subcategorize for the subjunctive. Despite the early emergence of the subjunctive, it is not fully acquired until approximately the age of 7 and may not completely stabilize until adolescence (Blake, 1983). Production is particularly variable between the ages of 5 and 7, and children are most accurate with indirect commands with volitional expressions, and adverbial clauses with *para que* “so that” (Blake, 1983).

Although studies of bilingual children are quite limited, early development of the subjunctive is similar to that of monolinguals (Silva-Corvalán, 1994b). However, Silva-Corvalán (2014) notes both simplification and loss of the subjunctive between the ages of 3;0 and 5;6, suggesting that shifts in language dominance may disrupt the acquisition of the subjunctive. Also, bilingual children have been shown to use the indicative mood more than the obligatory subjunctive with expressions of doubt and attitude, as well as with expressions of false belief. Acquisition of these latter constructs has been shown to accelerate with age (Pérez-Leroux 1998), suggesting that cognitive development may also affect the acquisition of the subjunctive mood.

2.4.6 Summary

In summary, these studies indicate that the morphological structures tested in this study emerge at roughly the same time in both monolingual and bilingual children, but follow independent paths of development as the children grow older. While in monolingual children gender agreement and some verbal morphology (subject/verb agreement and present/preterit distinctions) stabilize by the age of three, bilingual children experience continued difficulty with these morphemes. These studies also suggest that the younger a child is when the onset of bilingualism or shift in language dominance occurs, the more their knowledge of morphology is affected. Because the timeline of morphological acquisition in monolinguals stretches from approximately 2 to 7+ years of age, the timespan during which children begin formal schooling, these studies suggest that the acquisition of later-acquired morphemes by heritage bilinguals may be particularly affected by changes in the input.

2.5 Morphosyntactic knowledge in adult Spanish heritage bilinguals

Considering the various factors which affect the acquisition of morphology in bilingual children, the influences shaping the grammatical systems of adult heritage bilinguals are no doubt even more numerous and complex. That said, multiple studies of the grammatical systems of adult Spanish heritage bilinguals do converge in several areas of morphosyntax. More specifically, these bilinguals tend to have “persistent difficulty” (Bowles, 2011, p. 254) with nominal inflection (including number/gender agreement), as well as verbal inflection (including subject/verb agreement and tense/aspect/mood morphology). While these studies suggest that the core syntax of Spanish heritage bilingual grammars is intact, the intersection of this core syntax

with discourse-pragmatic or semantic knowledge may result in heritage bilinguals experiencing difficulty accessing, interpreting, and producing late-acquired morphemes that communicate more complex semantic information (Bolger & Zapata, 2011; Martínez-Mira, 2009; Montrul, 2009). In this section I summarize key research on the morphological knowledge of adult Spanish heritage bilinguals. I also mention variables such as proficiency, type of bilingualism and task effects when these help explain patterns in the studies.

2.5.1 Gender agreement

Montrul et al., (2008) and Martínez-Gibson (2011) examine the comprehension and production (written and oral) of gender in Spanish NP's in determiner, noun, and adjective positions. Montrul et al., (2008) find that L2 learners outperform heritage bilinguals in picture identification and writing tasks, particularly at low and intermediate proficiency levels. However, in oral production tasks (picture description tasks), both Montrul et al., (2008) and Martínez-Gibson (2011) find that heritage bilinguals are more accurate than L2 learners. Although accuracy varies as a result of task type, both learner groups make similar errors. Both groups show preferences for default masculine forms and more errors are made in matching determiners to nouns than in producing gender-matched adjectives. Differences in accuracy between learner groups are attributed to the ways in which task type and learning environment interact. Specifically, naturalistic input experienced in childhood may enable Spanish heritage bilinguals to perform better on spoken tasks, while classroom instruction may give L2 learners an advantage on tasks that require metalinguistic knowledge.

While all learners groups performed above chance on all experimental tasks indicating

knowledge of gender agreement, various tasks tap linguistic knowledge differently. Spanish heritage bilinguals are most accurate in spoken tasks and are less accurate in written and perception tasks, although this spoken advantage seems to depend on whether productive oral skills were developed in childhood. Additionally, proficiency is correlated with gender marking accuracy on oral, written, and perception tasks. Because all participants in these studies were currently enrolled or had been enrolled in Spanish language classes, the effect that formal instruction may have had on these results is unclear. Importantly, even the least proficient Spanish heritage bilinguals showed evidence of having some knowledge of gender agreement.

2.5.2 Subject/Verb agreement & present/preterit distinctions

Studies which isolate subject/verb agreement and present/preterit distinctions from tense/aspect considerations in populations of Spanish heritage adult bilinguals are scarce (Schmid, 2002). One exception is Beaudrie (2009a), who looked at trends in language maintenance among receptive bilinguals from three different generations (2nd, 3rd and 4th). Participants who were enrolled in a course for receptive bilinguals completed an oral and written personal narrative, and an oral and written picture narrative. In the subject/verb agreement condition, accuracy scores were statistically similar between both task types and across generations. Accuracy across task type and generation ranged from $M = 75.9$ to $M = 86.6$, indicating that these learners do have robust knowledge of agreement. In regards to tense distinctions, Beaudrie (2006) finds that prior to a semester-long pedagogical intervention, Spanish RHBs rely heavily on the present tense and overextend its use, while using the preterit to a lesser degree. Regardless, these results indicate that receptive bilinguals have underlying

knowledge of present and past tense distinctions.

2.5.3 Preterit/Imperfect aspect

Montrul (2002) compares early simultaneous and early sequential Spanish heritage bilinguals' knowledge of preterit/imperfect aspect to that of late child L2 learners and L1 Spanish speakers. Tasks included oral production, written morphology recognition, written sentence completion and a truth value judgment task. While all learner groups exhibit knowledge of preterit/perfect aspect distinctions in Spanish, results vary according to task type and type of bilingualism. Spanish heritage bilinguals are most accurate in oral, narrative tasks in comparison to the other written experimental tasks, and no statistical differences were found between simultaneous and sequential bilinguals in the oral task. Differences in type of bilingualism were significant for the written morphology recognition task (participants had to choose between the preterit and the imperfect within a short story), and the simultaneous bilinguals scored significantly lower than the other learner groups. In comparison, sequential bilinguals and L2 learners performed statistically like the L1 control group. Both heritage bilingual groups were significantly less accurate on the written sentence completion and truth value judgment tasks than were the L1 and late L2 learner groups, but simultaneous heritage bilinguals were affected to a greater degree. Montrul (2009) finds similar task effects. Spanish heritage bilinguals are most accurate in oral production tasks (a story retelling task, in this case), and intermediate and advanced Spanish heritage bilinguals performed statistically like the control group. A low-proficiency heritage bilingual group produced the imperfect minimally. Error rates collapsed over bilingual groups were higher for the imperfect, indicating extension of the preterit to imperfect contexts at all proficiency levels. A similar pattern of errors was found in the written

morphology recognition task, as accuracy was higher for preterit forms and was correlated to learner proficiency. A sentence conjugation judgment task, which probed sensitivity to semantic violations, revealed that all groups were able to differentiate between the preterit and imperfect. Proficiency again played a role, and low and intermediate proficiency groups were significantly less sensitive to semantic violations than were the advanced and monolingual control groups.

Montrul and Perpiñan (2011) conducted one of the few existing studies comparing proficiency-matched beginning, intermediate and advanced Spanish heritage bilinguals to L2 learners in their knowledge of tense, aspect and mood morphology. Regarding aspect, a morphology recognition task revealed that L2 learners are generally more accurate than heritage bilinguals and are also more accurate with imperfect forms, with significant differences between proficiency levels in all learner groups. However, a sentence conjugation judgment task testing participants' sensitivity to the semantics of aspect distinctions showed that Spanish heritage bilinguals were more accurate overall in discriminating between minimal pairs than were L2 learners in the low and intermediate proficiency levels. Accuracy was better overall for rejection of the preterit in imperfect contexts than the inverse in both learner groups.

Task effects are once again confirmed. Spanish heritage bilinguals are more accurate in oral tasks than in written/perception tasks, although among those tasks heritage bilinguals perform better on morphology recognition tasks than they did on sentence conjugation judgment tasks; the latter which is more complex in nature and examined sensitivity to nuanced semantic meaning. Type of bilingualism was also found to be significant, particularly in written and perception tasks, and accuracy was particularly affected if bilingualism was simultaneous rather than sequential. These results suggest that the earlier one acquires a dominant L2 in childhood,

the more their L1 or heritage grammar will be affected even when proficiency is matched. Conversely, the later one acquires their L2, the less difficulty they will have with preterit/imperfect aspect, particularly for marked and infrequent forms. Although all Spanish heritage bilinguals had some degree of aspectual knowledge, results suggested that the least proficient heritage bilinguals do not have access to the semantic knowledge necessary to resolve aspectual conflicts. Spanish heritage bilinguals are less accurate overall with imperfect forms than they are with preterit forms, and there is evidence of expansion of preterit forms into semantically imperfect contexts.

2.5.4 Indicative/subjunctive mood

Montrul (2009) examines knowledge of mood morphology in beginning, intermediate and advanced proficiency heritage bilinguals in comparison to an L1 control group. An opinion elicitation task designed to elicit production of the subjunctive revealed a significant increase in subjunctive tokens and decrease in indicative forms as proficiency increased. All heritage bilingual groups made errors regardless of proficiency, and extension of the indicative to subjunctive contexts was more frequent than the inverse. Difficulty distinguishing between moods was particularly apparent in the low proficiency group. A written morphology recognition task also revealed significant group effects for the subjunctive between the low, intermediate, and advanced proficiency groups. A written sentence conjugation judgment task showed that while all heritage bilingual groups still made errors, the advanced bilinguals were able to discriminate between the indicative and subjunctive in three clause types. The intermediate bilinguals discriminated between mood morphology in one early-acquired clause type, and low-proficiency bilinguals were not able to discriminate between mood morphology in any of the

clause types.

Montrul and Perpiñan (2011) compared proficiency matched Spanish heritage bilingual and L2 learner groups to examine knowledge of mood utilizing morphology recognition and sentence conjugation judgment tasks. Results of the morphology recognition task showed that L2 learners were more accurate overall with subjunctive forms than were Spanish heritage bilinguals. All learner groups except the beginning heritage bilingual group showed some recognition of mood morphology. Results of a sentence conjugation task revealed no discrimination between the indicative and subjunctive at low or intermediate proficiency levels for either learner group, although L2 learners were significantly more accurate than heritage bilinguals at the advanced proficiency level.

Martinez-Mira (2009) utilized oral interviews and a questionnaire eliciting written production to quantitatively test Spanish heritage bilinguals' knowledge of mood. Participants were placed in one of seven heritage bilingual categories depending on language background and generation of immigration, creating a continuum that situated participants based on their contact with Spanish. Results somewhat mirrored those of Montrul (2009) and Montrul and Perpiñan (2011). Namely, the subjunctive appeared less frequently in written as opposed to oral data, and heritage bilinguals produced the subjunctive less frequently than did the L1 speaker group. Also, heritage bilinguals frequently extended the indicative to subjunctive contexts, and use of the subjunctive increased along with individuals' exposure to Spanish. In the oral data, heritage bilinguals and L1 speakers produced similar rates of the subjunctive.

In one of the few studies to use psycholinguistic tasks to assess Spanish heritage bilingual

morphological processing, Villegas (2014) utilized eye-tracking methodology to determine whether an L2 immersive environment affects L1 processing, and whether Spanish heritage bilinguals exhibit evidence of predictive processing of indicative and subjunctive morphology. Correlations between underlying processing and offline, written production were also examined. Two groups of bilinguals were tested; a group of L1 Spanish speakers who moved to the US in adulthood (late age of acquisition of English), and a group of Spanish heritage bilinguals who experienced early onset of bilingualism. A proficiency test revealed that the bilinguals were significantly less proficient than the L1 learners. In the eye-tracking task, subjects read sentences that contained ditransitive verbs which ambiguously subcategorize for both noun phrases (NPs) and sentence complement (SC) clauses. Subcategorization for NPs is less frequent, and the subordinate verb in the SC clauses must obligatorily appear in the subjunctive. If participants are sensitive to subjunctive/indicative mood distinctions, then it is predicted that the subjunctive mood will be activated once participants access the main verb, and reading times will be longer in the critical region (the first subordinate verb) when the verb is in the indicative versus the subjunctive mood. Indexes of early processing (gaze duration) and later processing (total duration) were measured. As predicted, gaze durations were significantly longer when the verb in the relative clause was in the indicative, although there was no significant effect between groups, indicating that Spanish heritage bilinguals are as sensitive to mood distinctions as are L1 speakers. Despite this, the same heritage bilinguals performed at chance on a written output task that tested knowledge of mood morphology. Crucially, this study reveals the potential that online experimental techniques have to reveal production/perception asymmetries, and also to gauge underlying grammatical knowledge that might not be captured by other experimental task types.

In comparison to gender marking and tense-aspect distinctions, studies of mood morphology more clearly suggest the effect that developmental factors may have on the acquisition of morphology. While heritage bilinguals at all proficiency levels in the previously mentioned studies have measurable knowledge of gender and preterit/imperfect morphology, the least proficient learners in studies of mood do not seem to be sensitive to mood distinctions, even in perception tasks. Mood stabilizes relatively late in childhood, and after the age at which many heritage bilinguals have begun formal schooling in English. What can be extrapolated from trends in the results of these studies is that the acquisition of late acquired morphemes, which may rely in part on cognitive development, is particularly affected when the acquisition process is interrupted by the onset of bilingualism or a shift in language dominance.

2.5.5 Summary

Taken together the studies reviewed in this section indicate that Spanish heritage bilinguals possess intact, core syntax and knowledge of nominal and verbal morphology. However, this knowledge varies according to proficiency, task type, and type of bilingualism. Proficiency asymmetries revealed by task type indicate that Spanish heritage bilinguals are more accurate in the oral domain, and less accurate in written tasks/perception tasks. Proficiency also plays a role in accuracy, and positive correlations exist between proficiency level and accuracy across task types. While proficiency seems particularly predictive of accuracy in some tasks, (written/perception), as a whole heritage bilinguals are more uniformly accurate in oral tasks, despite proficiency level. Type of bilingualism is also a strong predictor of morphological knowledge, and grammars of simultaneous bilinguals are more affected than those of sequential

bilinguals even when learners are matched for proficiency. Knowledge of morphemes acquired relatively late in childhood (such as mood morphology) is less robust, which is likely due to shifts in language dominance or a reduction of Spanish input during the school age years. However, Villegas (2014) shows that knowledge of late-acquired morphemes may be revealed by utilizing psycholinguistic tasks, even when knowledge of these same morphemes is not detectable in the results of other task types.

2.6 Theoretical considerations regarding the linguistic systems of heritage bilinguals

Heritage language grammars have been characterized and evaluated in various ways over the last 50 years. With few exceptions, descriptive terminology has generally carried negative connotations and implies that heritage languages fall short of other language varieties. This notion of deficiency has existed since the early 1970's (and likely existed prior to this), and was addressed by the AATSP in a volume titled, "Teaching Spanish in School and College to Native Speakers of Spanish". This publication defended the use of local dialects in the Spanish language classroom, among other pedagogical suggestions, and was written to counter ways in which varieties of Spanish other than "world standard Spanish" were devalued by educators. Other terms used to describe the nature of heritage grammars include "non-native attainment" and "non-native outcomes". These terms position L1, monolingual varieties as the sole standard by which all other language varieties should be compared and evaluated.

The term that has been used pervasively over the past decade in reference to heritage grammars is "incomplete acquisition". This term was first coined by Schachter (1990), who proposed the *Incompleteness Hypothesis* to account for the differences between the grammatical systems of late bilinguals and monolingual speakers. Montrul (2008), recognizes the lack of a

better term and defines incomplete acquisition as the end state of a heritage bilingual's grammar which was either never fully acquired or underwent attrition in childhood, or some combination of both. This term is used inconsistently in the literature, however, and can also refer to the language acquisition process itself. For example errors are often attributed to being "the result of incomplete acquisition in childhood" (Anderson, 1999; Potowski, Jegerski, & Morgan-Short, 2009). It is therefore important to avoid conflating factors which contribute to the development of unbalanced bilingualism in childhood, and terms that refer to the end state, or linguistic outcomes of a heritage bilingualism.

I now turn my attention to the theories that have been proposed to account for the nature of heritage language grammars. These theories fall into three major camps: 1) those that attempt to explain how language that was acquired in childhood was later lost (attrition), 2) those whose goal is to explain why certain structures were never acquired in the first place (incomplete acquisition), and 3) those that view heritage grammars as distinct but completely acquired varieties. Summaries of key theories are provided below.

2.6.1 Theories related to attrition

The earliest frameworks which played a role in language attrition studies approached the processes of learning and forgetting from a cognitive-psychological perspective (Köpke & Schmid, 2004; Ecke, 2004). Drawing from theories of forgetting, it was posited that the process of attrition was rooted in the "cognitive nature of memory" (Köpke & Schmid, 2004, p. 16; Schmid, 2002, 2010). The earliest of the theories of this nature is the regression hypothesis (Jakobson, 1941), originally proposed to account for the selectivity of language loss as result of aphasia. The regression hypothesis claims that language loss is the mirror of chronological

language acquisition in childhood, or “that which is learned last is lost first” (Köpke & Schmid, 2004, p. 16).

Although similar in its theoretical underpinnings, the activation threshold hypothesis proposes that frequency, rather than chronology, plays a central role in language maintenance (that which is used most often used and reinforced, is preserved longest) (Köpke & Schmid, 2004, p. 16). This hypothesis establishes a relationship between frequency of use, activation, and inhibition. The more frequently and recently a form has been used determines its ease of access (Schmitt, 2010). Use is inversely related to a form’s activation threshold which is defined as the strength of the stimulus needed to activate the form. Any time a form is used in one language the other language is inhibited, which raises the activation threshold.

It is now widely accepted that the regression hypothesis does not adequately account for language loss in aphasics (Bardovi-Harlig & Stringer, 2010; Köpke & Schmid, 2004), and evidence for its applicability to L1 attrition is mixed and inconclusive (Gurel, 2004; Keijzer, 2010; Köpke, 2004; Paradis, 2007). This theory has been considered “flawed” in its ability to account for L1 attrition data in the sense that some aspects of language, such as the lexicon, are much more affected by frequency affects in adult L1 attrition than are other aspects such as grammar (Bardovi-Harlig & Stringer 2010, p. 4). Evidence as to its explanatory power has been tentatively supported by patterns of knowledge in heritage grammars, (Montrul, 2009).

2.6.2 Heritage grammars as incomplete

One hypothesis that has been put forth to account for the nature of the less dominant language in simultaneous bilinguals is the Weaker Language as L2 Hypothesis (Schlyter, 1993;

Schlyter & Hakansson, 1994). According to this hypothesis, the dominant language develops like an L1 in the sense that acquisition is guided by Universal Grammar, while the grammar of the weaker language is a “rogue” grammar (Meisel, 1997) which is not guided by parameter setting or re-setting, and therefore violates principles of Universal Grammar.

However, as the studies of morphological knowledge summarized earlier demonstrate, there is evidence for parameter setting in both the stronger and weaker language in heritage bilingualism. Montrul (2004a) proposes an alternate hypothesis that borrows elements from the regression, activation threshold, and Weaker Language as L2 hypotheses in order to address the roles of Universal Grammar and various environmental factors in unbalanced bilingualism. Borrowing from Schlyter (1993) and Schlyter and Hakansson (1994) she titles her hypothesis the “Weaker Language as L1 hypothesis” (Montrul, 2008, p. 126). The main premise of this hypothesis is that the weaker language may exhibit developmental lags, however it develops “through the same cognitive and linguistic means used to acquire the stronger language available in early childhood” (Montrul, 2008 p. 126). The weaker language is governed by Universal Grammar and the same implicit learning mechanisms that guide acquisition of the stronger language, but asymmetries between the two languages (as well as individual differences between speakers), are hypothesized to be the result of variable input and opportunities for language use. Activation also plays a role, as does order of acquisition; however in regards to the latter, it isn’t the order of acquisition per se that determines which features are retained. Rather, patterns of language use in childhood and shifts in language dominance affect which language is more active, and may interrupt the acquisition of features that are acquired later in childhood.

2.6.3 Heritage grammars as distinct varieties

Various scholars have begun to examine alternative ways to conceptualized heritage and bilingual grammars that address the inherently problematic nature of the concept of “incomplete acquisition”. Pascual y Cabo and Rothman (2012) and Kupisch & Rothman (2016) provide concise and compelling arguments as to why applying the term “incomplete acquisition” to heritage language grammars (and the processes by which they are acquired) is flawed on descriptive, theoretical, and ideological grounds. Their arguments are based on two primary assertions: the first is that by definition, the term ‘incomplete’ does not precisely describe heritage grammars, which the authors argue are simply different than other varieties. The second is that the term ‘incomplete’ evokes the notion that the language systems of these bilinguals fall short of an arbitrary, monolingual target variety. Since comparisons to monolingual varieties have historically been used to devalue the language abilities of heritage bilinguals, the authors argue that this comparison is neither fair nor justifiable.

In relation to the first assertion, which takes issue with the descriptive inaccuracies of the term “incomplete”, the authors point to the absence of life-long longitudinal studies of heritage grammars. The vast majority of research on heritage grammars has evaluated the language skills of adult bilinguals. Without a detailed account of their language learning trajectories, it virtually impossible to determine whether a structure was acquired and then underwent attrition, or whether it was never acquired in the first place. As both these phenomena are widely grouped under the umbrella of incomplete acquisition in the literature, the term becomes misleading.

Their second point is supported by the fact that the input that heritage bilinguals receive is variable and itself affected by processes of language contact and change. Therefore, it is

simply not valid to label an acquired variety as incomplete in comparison to a monolingual variety to which it was never exposed.

Otheguy (2013) offers a similar argument and critique of the term incomplete acquisition on the grounds that it ignores the nature of input received, monolingual standards are problematic, and the notion of incompleteness has not been defined. In relation to the role of input in acquisition, Otheguy (2013) notes that grammars are not simply downloaded from one generation to the next, but that each subsequent generation acquires language through a process of hypothesis formation and testing based on the input they receive from the previous generations. Intergenerational language change occurs even in monolingual contexts, and so the author argues that what have been considered errors or non-target structures in the previous studies are actually nothing more than dialectal differences or divergences. Otheguy's second argument also takes issue with the monolingual standard, and he points to the fact that there is not one universal monolingual variety. That being the case, it is not possible to determine whether or not one's language acquisition meets the standard. Lastly, the Otheguy argues that while notions of "completeness" have been conceptualized, their counterpart, "incompleteness" has not. Without a clear idea of what constitutes completeness, the use of the term is inherently problematic.

Putnam and Sánchez (2013) have proposed a theoretical model that circumvents the notion of "incompleteness" and provides a framework which addresses the variable outcomes of heritage and contact bilingualism. More specifically, this model takes into account the varying levels of activation that characterize the language acquisition process any given bilingual, as well as the effect that activation of the L1 and L2 has on linguistic outcomes. What may seem on the

surface to be a “simplified” grammar, is merely a product of the various ways in which the lexicon and the relationship between functional, semantic and phonological features in the L1 and L2 were activated during the language acquisition process (2013, p. 3). The result is a grammar that falls somewhere on a sliding spectrum. The authors point to previous studies as evidence of how the results correspond to various stages on this sliding spectrum. At one end of the scale, the disassociation between functional and lexical features might result in the simplification of certain systems, such as tense and aspect. At the other end of the spectrum, a heritage bilingual may have trouble activating both the phonological and semantic features of their heritage language, making both production and comprehension difficult.

Cabo, Lingwall and Rothman (2012) propose that the missing surface inflection hypothesis can account for asymmetries between the perceptive and productive skills of L2. For example, the authors note that unconscious knowledge of the features underlying tense and agreement may not be represented in production. According to the missing surface inflection hypothesis, this asymmetry is not regarded as a deficiency in the grammatical system per se, but rather production is impaired due to underlying forms which have not been mapped to nominal and verbal inflection in production. The tenets of this hypothesis show promise in relation to their ability to also account for the asymmetry between receptive and productive skills that characterizes the bilingualism of Spanish RHBs. These models will be revisited in the Chapter 5 in relation to their ability to account for the results of this study.

2.7 Spanish RHBs in the US

As was mentioned in Chapter 1, Beaudrie (2009a) describes Spanish RHBs as being on the “verge of culminating the language shift towards English monolingualism” (p. 86), although receptive bilingualism is nevertheless considered to be a valid type of bilingualism in its own right. Beaudrie (2009a) and Beaudrie & Ducar (2005) conducted in-depth studies of the cultural and sociolinguistic profiles of Spanish RHBs in the Southwest United States from three different generations (2nd, 3rd and 4th generation). These learners typically grow up in households with at least one individual, typically a parent, who is a L1 or L2 Spanish speaker. However, most participants also reported English as their L1 and that they were exposed to more oral Spanish than they produced. The nature of their contact with Spanish is passive and they overhear the language more than they actively use it. Their formal schooling has been conducted primarily in English, resulting in limited literacy skills in Spanish.

In regards to specific language abilities, Au et al. (2002, 2008) found that “overhearers” of Spanish (defined as individuals who overheard but did not speak Spanish in childhood), had advanced phonology and their production of certain voiceless stops was “nativelike”. Their morphological knowledge was well developed for grammatical number, although Spanish overhearers had difficulty identifying grammatical morphemes in the gender condition. Beaudrie’s 2006 study of Spanish RHBs with production abilities showed similar patterns in morphological knowledge as reflected by a production task. Taken together, these studies suggest that morphology does form part of Spanish RHB grammars, but that knowledge of morphology is variable in all morpheme classes tested.

2.8 Conclusion

In this chapter I have summarized what is known about Spanish heritage language grammars from a descriptive and theoretical standpoint. This discussion has delineated the ways in which heritage bilingualism is understood and defined, and I have summarized the primary findings related to their specific linguistic knowledge. I have also reviewed theories put forth to account for the grammars of heritage bilinguals from a deficit viewpoint, and have summarized alternate viewpoints which characterize heritage grammars as completely acquired but distinct from monolingual grammars. In Chapter 3, I detail the methodology that was utilized to evaluate the language skills of Spanish RHBs in this study. This includes the motivation behind and protocol for each of the experimental tasks, the statistical analyses conducted, and the ways in which each experimental task addresses the research questions and hypotheses.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Although interest in Spanish-English heritage language bilingualism and pedagogy is a growing area of inquiry (Beaudrie, 2011; Beaudrie, Ducar & Potowski, 2014; Beaudrie & Fairclough, 2012; Carreira & Kagan, 2011; Pascual y Cabo & Rothman, 2012; Potowski, Parada & Morgan-Short, 2012; Valdés, 2012), little is known about the nature of the linguistic systems of Spanish RHBs. These bilinguals have been described as being on the “verge of culminating the language shift towards English monolingualism” (Beaudrie, 2009a, p. 86), and exhibit marked asymmetry between their receptive and productive skills. Spanish RHBs report that they are able to understand their heritage language, but their literacy skills are limited and they often experience difficulty when producing speech (Au et al., 2002, 2008; Beaudrie, 2006, 2009a; Beaudrie & Ducar, 2005; Myers-Scotton, 2006). The aural comprehension abilities of Spanish RHBs have been measured at a low- to medium-intermediate level as defined by ACTFL standards (Beaudrie, 2006), however the underlying grammatical knowledge of Spanish RHBs and its relationship to aural comprehension has not yet been tested. This study examines the ways in which Spanish RHBs process and comprehend spoken Spanish, with a specific focus on morphosyntactic knowledge.

The primary goal of this study is to determine whether Spanish RHBs are sensitive to the grammaticality of bound morphemes, and whether they process these morphemes for meaning when listening to spoken Spanish. The vulnerability and variability in the acquisition of morphology in heritage bilinguals in childhood is well-attested in the literature (Cuza et al., 2013; Martínez-Mira, 2009; Montrul, 2002, 2004a, 2008; Montrul et al., 2008; Pascual y Cabo &

Rothman, 2012; Pires & Rothman, 2009; Polinsky, 2008) and previous studies of heritage grammars have revealed that morphology can be a source of difficulty in both interpretation of meaning and production, even for more proficient bilinguals with receptive and productive skills (Montrul, 2002, 2006, 2008, 2009, 2011; Montrul et al., 2008; Polinsky, 2006, 2008; Silva-Corvalán, 2003, 2014; Villegas, 2014). If morphology poses difficulties even for more proficient bilinguals then it follows that underlying grammatical knowledge might also be a source of linguistic difficulty for Spanish RHBs. The overarching question as it relates to the language abilities of these bilinguals and this research is this: is knowledge of morphology measurable in a population of Spanish RHBs? If the answer is yes, is sensitivity to the grammaticality of all morphological classes similar or are some errors more salient than others? If sensitivity to errors is not the same for all morphemes, then what might account for the differences?

A secondary set of questions relate to how the underlying grammatical systems of Spanish RHBs are reflected in different domains of linguistic knowledge, and more specifically, in aural comprehension. Do Spanish RHBs understand everything that they hear in conversational Spanish? Are they able to extract meaning from spoken Spanish when that meaning is disambiguated by the semantic contribution of bound morphemes? Does the strength of correlations between tests of morphological processing and tasks measuring global comprehension suggest that Spanish RHBs are able to access the semantic features of bound morphemes in order to understand spoken Spanish? Or might their understanding be based on other cues, such as the processing of familiar lexical items or pragmatic knowledge in familiar conversational settings?

While morphological knowledge has been tested in other populations of heritage bilingual (see Chapter 2 for a more detailed discussion), assessing this knowledge in a population of receptive bilinguals poses certain methodological challenges. Mainly, it is not possible to replicate previous studies of heritage bilingualism, as the assessment measures used often require literacy skills, speaking ability, metalinguistic knowledge, or a combination of these skills (Au et al., 2002, 2008; Cuza et al., 2013; Martinez-Gibson, 2011; Montrul, 2009, 2011; Montrul et al., 2008). Assessment measures commonly used to investigate grammatical abilities include production tasks, written grammaticality judgment tasks, and written perception and reading tasks. However, tasks relying on literacy skills or metalinguistic knowledge may not reflect the underlying knowledge of heritage bilinguals. For example, in a recent study of the language skills of advanced Spanish heritage bilinguals (Villegas, 2014) showed that grammatical knowledge that was not detected by a written task was later revealed by utilizing online psycholinguistic research methods.

Therefore, to address the challenge of assessing the grammatical abilities of Spanish RHBs, this study utilizes aurally-presented on- and offline laboratory tasks. These tasks were designed to both implicitly and explicitly test grammatical and morphological knowledge without requiring subjects to read, speak or write in Spanish. These were modeled in part after the assessment measures used in Sherkina-Lieber's 2011 study of receptive bilinguals of Labrador Inuttitut. Although the results from Sherkina-Lieber's research are not directly comparable to this study due to language-specific differences (Labrador Inuttitut is a polysynthetic language whose morphosyntactic structure differs significantly from that of Spanish), she was nevertheless able to show, using a series of aurally-presented tasks, that even

low proficiency receptive bilinguals have underlying knowledge of the rules that govern morphological structure. In the current study, one of these tasks is further adapted so that it is self-paced; this is done so that language processing is observed in “real time”, and reaction times can be analyzed for evidence of processing difficulty. In total, four laboratory tasks are used in this research: these include an online aural grammaticality judgment task, an offline aural morpheme interpretation task, a global comprehension task, and an aurally-presented proficiency (elicited imitation) task. Additionally, a biographical questionnaire was administered in order to collect Spanish RHBs’ language histories for descriptive purposes. Each of these tasks will be described in more detail in the following sections.

Although this dissertation investigates a very specific aspect of grammatical knowledge, it also addresses larger questions faced by applied linguistics. These questions include what knowledge is required to ‘know’ a language, and how heritage grammars should be characterized. This research contributes to the literature on bilingualism and heritage languages in the following ways: 1) It furthers our understanding of the nature of contact bilingualism by examining the language abilities of an understudied group, and 2) It provides an in-depth examination of one area of RHB grammar which has been shown to cause difficulties in populations of heritage bilinguals more generally. Also, a deeper understanding of Spanish HRB grammatical competence may also shed light on the reason for the asymmetry observed between their comprehension and production skills. Lastly, in addition to contributing to our understanding of bilingualism, the results of this study have implications for the instruction, maintenance and revitalization of Spanish as a heritage language in the US as they provide a

point of departure for the development of pedagogical practices targeting the grammatical development of receptive bilinguals.

The remainder of this chapter describes the procedures followed during the study, including the research questions and predictions, assessment creation, participant recruitment and selection, and data collection and analysis.

3.2 Research questions

The research questions presented in Section 1.5 in Chapter 1 have been included here for reference, along with the experimental task used to answer each one.

Research Question 1: How accurately are Spanish RHBs able to extract meaning from aurally presented, conversational Spanish?

Experimental Task Used: Contextualized listening comprehension task

Research Question 2: How do Spanish RHBs perform on an aural task measuring global Spanish language proficiency?

Experimental Task Used: Elicited imitation task

Research Question 3: Are Spanish RHBs sensitive to morphosyntactic well-formedness in spoken Spanish, and to what degree?

- a. How does sensitivity to grammaticality vary between morpheme conditions?
- b. What might account for variation between morpheme conditions?

Experimental Task Used: Aural grammaticality judgment task

Research Question 4: Do Spanish RHBs extract meaning from bound morphemes in spoken Spanish?

- a. How does the ability to interpret morphemes for meaning vary across morpheme conditions?
- b. What might account for variation between morpheme conditions?

Experimental Task Used: Aural Morpheme Interpretation Task

Research Question 5: What do correlations between the experimental tasks suggest about the interrelatedness of the skills and knowledge that they evaluate?

Analysis Used: Correlations are examined between different experimental tasks.

Research Question 6: What characterizations of heritage language grammars best represent the language skills of Spanish RHBs?

Analysis Used: No specific task or analysis was utilized to answer this question, but rather the performance of Spanish RHBs was considered across all tasks.

Taken together, these research questions examine the nature of the linguistic abilities of Spanish RHBs in a way that they have not been measured before. Research questions 1 and 2 establish a baseline of Spanish listening comprehension ability and proficiency in Spanish. Research questions 3 and 4 relate to the vulnerability and variability of morphosyntactic development in heritage language acquisition in childhood. Studies of heritage grammars have argued that the acquisition of some functional morphemes may be more difficult than others (Bolger & Zapata, 2011; Cuza et al., 2013; Martínez-Mira, 2005; Martínez-Gibson, 2011; Montrul, 2002, 2004a, 2011; Montrul et al., 2008; Polinsky, 2006; Sherkina-Lieber, 2011; Silva-

Corvalán, 1991, 1994a, 1994b, 2014). Of particular interest are the patterns that Spanish RHBs exhibit in their knowledge of Spanish morphology, and the possible explanations for those patterns. For example, is accuracy in the experimental tasks higher for those structures that are acquired earlier rather than later in childhood? Are there differences in accuracy between morpheme classes whose function is primarily syntactic (such as in gender agreement) versus those expressing semantic properties (such as tense, aspect, and mood)? Question 5 examines the relationship between underlying grammatical knowledge and processing, and performance on other tasks. Lastly, research question 6 addresses the various characterizations that have been put forth to describe the language skills of heritage bilinguals. For example, is there evidence supporting a shift away from the view that heritage languages are characterized by various “deficiencies” in comparison to monolingually-raised speakers? Do we instead recognize that the unique language environments in which heritage bilinguals were raised result in linguistic systems that are different, but are in fact not “incomplete” as has been suggested by scholars in the field of heritage language acquisition (Martínez, 2003, 2009; Otheguy, 2013; Kupisch & Rothman, 2016; Pascual y Cabo & Rothman, 2012; Putnam & Sanchez, 2013; Valdés, 1981, 1995, 1997, 2000, 2005, 2012)? Hypotheses for each of these questions are outlined in the following section.

3.3 Predictions

While the linguistic abilities of Spanish RHBs are expected to fall on the lower end of the proficiency scale (Beaudrie, 2006, 2009a; Beaudrie & Ducar, 2005;), they are nevertheless expected to exhibit a good understanding of spoken Spanish (Beaudrie, 2006, 2009a). While their linguistic systems are expected to differ from those of both monolingually-raised speakers

and more proficient heritage bilinguals, they are nevertheless expected to show a degree of underlying morphosyntactic competence, and the ability to process morphology for meaning when listening to spoken Spanish (Au et al., 2002, 2008; Sherkina-Lieber, 2011, Sherkina-Lieber et al., 2011). Since all participants were exposed to Spanish at home during childhood but received all formal education in English, their Spanish grammatical systems as adults are expected to reflect the point at which participants were located on the acquisitional timeline when the shift in language dominance occurred. That is, structures that were acquired earlier in childhood are expected to be retained better than those acquired later (Anderson, 1999a, 1999b, 2012; Montrul, 2008, 2009, 2011; Montrul et al., 2008). Processing and comprehension difficulty are especially expected for those structures that are fully acquired after the commencement of formal education in English. Additionally, accuracy for those structures with syntactic functions is expected to be higher than that of structures whose function is semantic, particularly for those morphemes which are both acquired later and also express semantic properties which may be ambiguous (and whose acquisition may rely in part on cognitive development), such as mood (Gathercole, Sebastián & Soto, 1999; Martínez-Mira, 2005; Montrul, 2008, 2009; Pérez-Leroux, 1998). Lastly, it is expected that the data will support the argument that heritage grammars should be characterized as linguistic systems in their own right, which are “different” instead of “deficient” in comparison to monolingual grammars, and are reflective of the learning conditions in which the heritage language was acquired (Kupisch & Rothman, 2016; Martínez, 2009; Otheguy, 2013; Pascual y Cabo & Rothman, 2012; Putnam & Sanchez, 2013; Valdés, 2000, 2005, 2012).

3.4 Subjects and Recruitment

All subjects were recruited at the University of Arizona during the 2015-2016 academic year, and were enrolled as students at the time of recruitment and testing. Subjects were recruited in the following four contexts: 1) Spanish RHBs recruited from an undergraduate psychology pool; 2) Spanish RHBs enrolled in an introductory Spanish course (first semester) for receptive bilinguals; 3) Advanced heritage bilinguals recruited from an undergraduate psychology pool; and 4) Monolingually-raised Spanish speaking graduate students recruited from the Spanish & Portuguese department. The RHB group was comprised of participants recruited in the first two contexts. Group 3, the advanced heritage bilinguals, were recruited so that the Spanish RHB data could be seen alongside that of more proficient bilinguals of a similar language background. Group 4, the monolingual control group, was recruited to ensure that the experimental tasks themselves functioned as intended and expected, however their performance on the experimental tasks is not meant to be directly compared to that of the RHB and advanced heritage bilingual groups. A description of the process for recruiting and selecting participants in each of the groups is given below. Additionally, a summary of the language histories and biographical information for the Spanish RHB group is provided.

3.4.1 Recruitment of Spanish RHBs

1) A total of 9 Spanish RHBs were recruited from a pool of undergraduate students enrolled in introductory psychology courses. These subjects were recruited in person during the first two weeks of the Fall 2016 semester during class time by using a mass survey. This survey was designed to quickly identify qualifying participants from large numbers of students. (See

Appendix A for survey). Subjects were identified as Spanish RHBs and were considered eligible to participate in the study if their responses on the survey met the following criteria:

- Born in the US
- Of Mexican descent⁶
- Heard Spanish in the home while growing up
- Rated current Spanish speaking skills as “Beginning”, or “I don’t currently use Spanish”
- Level of listening skill when listening to a conversation in Spanish rated as “the general idea”, “almost everything” or “everything”

These criteria identified subjects as Spanish RHBs by highlighting those whose Spanish production and comprehension were in considerable asymmetry. After identifying potential subjects using the survey, participants were sent an email inviting them to complete the study. Those who participated received course credit per course policies.

2) A total of 24 Spanish RHBs were recruited from first-semester, elementary Spanish for receptive heritage learners courses at the University of Arizona (Spanish 103) during the Fall semester of 2015. These participants had been placed in the course based on the results of a language placement exam. The exam, administered by the Spanish and Portuguese department, distinguishes Spanish RHBs from elementary L2 learners by testing knowledge of familiar, home-based lexical items that an L2 learner would not likely have encountered. These participants were recruited in person during class time. After a brief explanation of the study and the criteria that identified eligible Spanish RHBs, participants signed up on a sheet which was

⁶ An effort was made to select participants who had been exposed to the same language variety to minimize the risk of dialectal differences affecting the experimental results.

passed around the room. Participants received either payment or extra credit for completing the study as decided individually.

Additional screening of Spanish RHB participants:

After the initial participant screening and selection process, additional measures were taken to ensure that participants' language skills fit the profile of a receptive bilingual. The first of these were the results of the contextualized listening comprehension task, which also doubled as one of the actual experimental tasks (see the description of this task in Section 3.6 below). Following the methodology of Beaudrie, 2006, participants whose scores on the listening comprehension task fell outside one standard deviation of the group mean were omitted from the study at the time of data analysis. Participants also completed an oral production task in which they were asked to narrate, as best they could in Spanish, the story of "Little Red Riding Hood" (Montrul, 2002), given a cartoon depiction of the fairytale (see Appendix B). Those participants who could narrate any portion of the story in complete, grammatical sentences were eliminated from the study prior to analyzing the data.

Limitations in recruiting Spanish RHB participants:

Although recruiting from the psychology pool in addition to the elementary Spanish language course ensured a greater number of participants, it also introduced certain limitations related to the homogeneity of the subjects overall. Unlike participants in the Spanish class, whose placement in a course for receptive bilinguals was the result of an objective placement exam, subjects from the psychology pool were chosen based on self-reports of their language

skills which do not always reflect actual language abilities (Dörnyei, 2003). However, as the students were not aware of which specific criteria would make them eligible for the study, nor were they known to the researcher, the motivation for participants to inaccurately report their language abilities would have been minimal.

In addition to screening factors, motivation may have differed between the two Spanish RHB groups and could have influenced the results. Completing a certain number of hours as a laboratory participant was mandatory for subjects from the psychology pool per course requirements. Therefore, these participants may have chosen to participate in this study regardless of their relationship to their heritage language. In contrast, subjects from the Spanish classes were actively engaged with their heritage language and their participation was both voluntary and compensated by either payment or extra credit points. This may have resulted in subjects from the Spanish course approaching the study with more motivation than did the participants from the psychology pool.

Lastly, it is possible that the language instruction that the students in the Spanish classes received could have affected the results of the study. These subjects were therefore tested at the beginning of the semester to mitigate any potential effect that formal instruction might have on the results.

In light of potential differences between the two RHB groups, their data was initially analyzed separately to determine whether there were statistical differences in performance between the two. Performance was similar overall, so the decision was made to all of these participants into one, Spanish RHB group.

3.4.2 Spanish RHB language history

Information was gathered about the receptive bilinguals' language backgrounds via a biographical questionnaire (see description of this task in Section 3.10 below). All Spanish RHBs were between the ages of 18 and 22 years ($M=18.13$, $n=30^7$), and all were born in the US. The majority were born in southern Arizona ($n=20$), followed by California ($n=6$), Texas ($n=3$), and North Carolina ($n=1$). The majority came from a Mexican background ($n=27$), although three participants were from other Spanish-speaking backgrounds⁸ (Bolivia, $n=1$; El Salvador, $n=1$; Guatemala, $n=1$).

The questionnaire also asked about parents' native languages and the language socialization practices participants experienced with parents and caregivers while growing up. Regarding their mothers' native languages, 43% ($n=13$) spoke Spanish as a native language, 33% ($n=10$) spoke both Spanish and English, and 23% ($n=7$) spoke English as their native languages. Participants' fathers' native languages were reported as 30% ($n=9$) Spanish, 20% ($n=6$) Spanish and English, and 50% ($n=15$) English.

When asked about their own language exposure as children, 73% ($n=22$) of participants reported exposure to both English and Spanish between birth and the age of 5. Another 13%

⁷ A total of 33 receptive bilinguals took part in the laboratory portion of the study although three participants did not complete the biographical questionnaire. They were, however, initially screened and selected using the same criteria as the rest of the participants. The descriptive information above comes from the 30 Spanish RHBs who completed the questionnaire.

⁸ These participants were recruited from the Spanish for heritage learners course. Although the selection criteria were explained to all potential participants, it was not until after the data had been collected that the biographical questionnaire revealed that they were not of Mexican descent. However, because all three grew up in cities with large numbers of Spanish speakers of Mexican descent (Tucson, Arizona; Vail, Arizona; Fullerton, California), and their scores on the experimental tasks did not deviate significantly from those of other participants, the decision was made to include their data in the study.

(*n*=4) reported being exposed to English first and Spanish after the age of 5. Lastly, 13% (*n*=4) reported being exposed to Spanish first, then English between the ages of 3 and 5.

Participants were also asked what languages their parents used to address them directly at home and what languages they themselves spoke at home while growing up. 3% (*n*=1) heard only Spanish from their mothers, 57% (*n*=17) heard English and Spanish, and 40% (*n*=12) heard only English from their mothers. A total of 7% (*n*=2) heard only Spanish from their fathers, 20% (*n*=6) heard Spanish and English, and 63% (*n*=19) reported that their fathers only spoke English to them. Two individuals (7%, *n*=2) reported hearing only Spanish from another caretaker, and one individual (3%) heard both Spanish and English from another caretaker.

In reporting their own language use with their parents while growing up, 40% (*n*=12) reported using both Spanish and English with their mothers while 60% (*n*=18) used only English. When speaking to their fathers, 20% (*n*=6) spoke English and Spanish to their fathers and 73% (*n*=22) spoke only English.

Rates of both exposure to and use of Spanish were higher with grandparents than with parents. Participants reported that 33% (*n*=10) had grandparents who only spoke to them in Spanish, 60% (*n*=18) were spoken to in Spanish and English, and 7% (*n*=2) were spoken to only in English. When speaking to their grandparents, 13% (*n*=4) used only Spanish, 50% (*n*=15) used Spanish and English, and 33% (*n*=10) used only English. These results are summarized in Table 3-1 below.

Table 3-1: Spanish RHB Language History

	Spanish only	Spanish & English	English only
Mother's native Language	43% (<i>n</i> =13)	33% (<i>n</i> =10)	23% (<i>n</i> =7)
Father's native Language	30% (<i>n</i> =9)	20% (<i>n</i> =6)	50% (<i>n</i> =15)
Language mother spoke to participant	3% (<i>n</i> =1)	57% (<i>n</i> =17)	40% (<i>n</i> =12)
Language participant spoke to mother	--	40% (<i>n</i> =12)	60% (<i>n</i> =18)
Language father spoke to participant	7% (<i>n</i> =2)	20% (<i>n</i> =6)	63% (<i>n</i> =19)
Language participant spoke to father	--	20% (<i>n</i> =6)	73% (<i>n</i> =22)
Language grandparents spoke to participant	33% (<i>n</i> =10)	60% (<i>n</i> =18)	7% (<i>n</i> =2)
Language participant spoke to grandparents	13% (<i>n</i> =4)	50% (<i>n</i> =15)	33% (<i>n</i> =10)

Importantly, 100% of the participants reported that upon beginning elementary school and through high school, the primary language of instruction was English, indicating a shift in the language input they received once they enrolled in school.

In addition to their language histories, participants were also asked to rate their current comfort level when listening to versus speaking Spanish on a scale from 1 to 5. The scale was as follows: 1=Very Uncomfortable; 2=Uncomfortable; 3=Neutral; 4=Comfortable; 5=Very Comfortable. Overall, participants reported feeling more comfortable listening to rather than speaking Spanish. Asymmetry between speaking and comprehension skills is expected in this population, and participants' ratings reflect this asymmetry. The average rating for comfort while listening to Spanish was $M=3.53$, with the largest number of participants (90%, $n=27$) assigning ratings of either "neutral" (37%, $n=11$) or "comfortable" (53%, $n=16$). The average rating for comfort while speaking Spanish was $M=2.37$, with the largest number of participants (87%,

$n=26$) assigning ratings of either “neutral” (40%, $n=12$,) or “uncomfortable” (47%, $n=14$). These results are summarized in Table 3-2 below:

Table 3-2: RHB Comfort level when listening to and speaking Spanish

	1= Very Uncomf.	2= Uncomf.	3= Neutral	4= Comf.	5= Very Comfor.	Average
How do you feel listening to Spanish?	$n=0$ 0%	$n=2$ 7%	$n=11$ 37%	$n=16$ 53%	$n=1$ 3%	$M=3.53$
How do you feel speaking Spanish?	$n=3$ 10%	$n=14$ 47%	$n=12$ 40%	$n=1$ 3%	$n=0$ 0%	$M=2.37$

Next, a brief description of the recruitment and characteristics of the advanced heritage bilingual comparison and monolingual control group is given. Because this study does not focus on either of these participant groups, only a snapshot of their characteristics is given.

3.4.3 Recruitment of comparison and control groups

3) A total of 41 advanced heritage bilinguals (AHBs) were recruited from the same psychology pool utilizing the same selection process as was described in (1) above, although different criteria were used to identify them. These subjects were considered eligible and were invited by email to participate if their responses to the mass survey fit the following profile:

- Born in the US
- Of Mexican descent
- Heard Spanish and English in the home while growing up
- Rated current Spanish speaking skills as “Native”, or “Advanced”
- Level of listening skill when overhearing a conversation in Spanish rated as “Everything” or “Almost everything”

These participants also received course credit for participating in the study as per their individual psychology course policies.

4) A group of 10 monolingually-raised Spanish speakers was recruited from the Department of Spanish and Portuguese via word of mouth. Because a pilot study was not conducted, the data from this group was used solely to confirm that the experimental tasks functioned properly, rather than the results of the monolingual group serving as a performance target by which the language skills of Spanish RHBs should be evaluated. These participants consisted of graduate students and teaching assistants, and were raised speaking and hearing only Spanish until at least adolescence; 5 spoke a Mexican dialect of Spanish, and 5 spoke a Peninsular dialect. All participants in this group performed at close to ceiling earning overall accuracy scores of 94% or higher on each of the experimental tasks, so differences in dialect and the small number of individuals in this group were not a cause for concern.

In total, the data from 93 participants was analyzed in this study. Tables 3-3 and 3-4 show the breakdown of these participants by recruitment context and type of bilingualism, respectively.

Table 3-3: Number of subjects by recruitment context

Recruitment Context	Number of Participants
Spanish RHBs (psychology pool)	9
Spanish RHBs (enrolled in Spanish course for receptive bilinguals)	24
Spanish AHBs (psychology pool)	41
Monolingually-raised Spanish speakers	10
Total	93

Table 3-4: Number of subjects by type of bilingualism

Type of Bilingualism	Number of Participants
Spanish RHBs	33
Spanish AHBs	41
Monolingually-raised Spanish speakers	10
Total	93

The remainder of this chapter focuses on the specific experimental procedures which were carried out in this study, including the design of the experimental tasks, participant protocol for completing those tasks, and a description of how the data was analyzed.

3.5 Experimental Procedure

The experimental design loosely follows that of Sherkina-Lieber's 2011 study of receptive bilinguals of Labrador Inuttitut. In total, each participant completed 4 experimental tasks and the biographical questionnaire. All tasks are listed below with the approximate time it took participants to complete each one.

1. A contextualized listening comprehension task (25 minutes – completed in lab)
2. An elicited imitation task (15 minutes – completed in lab)
3. An aural grammaticality judgment task (25 minutes – completed in lab)
4. An aural morpheme interpretation task (25 minutes – completed in lab)

5. A biographical questionnaire (30 minutes – completed at home)

The study was designed so that these tasks were completed in two sessions, taking participants approximately two hours in total to complete. Participants completed the first session, which lasted approximately 1.5 hours, in a lab on the University of Arizona campus. During the first session, participants first signed a consent form (Appendix C) which had been previously approved by the University of Arizona IRB office. After signing the form, participants were assigned numbers which were subsequently used to anonymously identify them and their corresponding data. At this point participants were then guided through the experimental tasks 1-4. The order in which the experimental tasks were presented to each participant was randomized to neutralized order effects. The second session, which was completed from home, consisted of the biographical questionnaire (task 5), which was administered electronically. This session took participants approximately 30 minutes to complete.

In the sections that follow each of these tasks is described in detail along with the research question they were designed to answer.

3.6 Contextualized Listening Comprehension Task

Research Question 1: How accurately are Spanish RHBs able to extract meaning from aurally presented, conversational Spanish?

To obtain a global measure of listening proficiency, participants completed the computerized Contextualized Listening Assessment (CoLA) in Spanish, which is part of the EMC Language Proficiency Assessments developed by the Center for Advanced Research on Language Acquisition (CARLA) at the University of Minnesota. This instrument was developed to evaluate the Spanish comprehension skills of secondary and post-secondary Spanish language learners at the ACTFL Intermediate-Low and Intermediate-High levels. While this assessment was developed to evaluate the listening comprehension of L2 learners specifically, it has also been used (see Beaudrie, 2006) to establish a reference for how the comprehension skills of Spanish RHBs compare to those of L2 learners.

While listening and comprehending may seem like a passive skill on the surface, it is rather a “complex, active process in which the listener must discriminate between sounds, understand vocabulary and grammatical structures, interpret stress and intonation, retain what was gathered in all of the above, and interpret it within the immediate as well as the larger sociocultural context of the utterance” (Vandergrift, 1999, p. 168). Following the methodology of Beaudrie (2006), results from this task were first used to determine whether participants had sufficient aural comprehension skills to be considered Spanish RHBs for testing purposes. Once the Spanish RHBs were identified, their results from this task were then used to answer research question 1, which is concerned with participants’ ability to follow and extract meaning from conversational Spanish.

3.6.1 Materials

In this task, participants listened to 35 brief, aural dialogues spoken by L1 Spanish-speaking characters portraying realistic communication in real-life situations. These characters

included a brother and sister pair and friends who spoke a Mexican dialect of Spanish, and a live-in exchange student who spoke a Peninsular variety of Spanish. The context of the dialogs included conversations that took place at the characters' homes, on a university campus, in a restaurant, and in other public spaces in a Latin American city. Topics discussed included chores, plans, the university, professions, and hobbies, among others. Photographs of actors representing the characters were used to contextualize the dialogs that participants heard. Both the photos and comprehension questions appeared on the computer screen before the dialog audio file started, and remained after the file ended. The pace of the task was participant-controlled. Following each audio dialog in Spanish, participants responded to multiple choice comprehension questions in English that were related to the content of what they heard. Participants had the option of listening to each dialog twice before selecting an answer from four possible options. All instructions and comprehension questions were presented in English script. The following image is a sample of what participants would see on the screen during one of the dialogs, along with a summary of the instructions given to participants via a short tutorial at the beginning of the task:

Figure 3-1: Example of image provided by contextualized listening comprehension task / summary of instructions

1. Prepare to listen

- Read the introduction to set the scene. →
- Look at the photo. →
- Read the question and possible answers. →

Martha asks the salesman about what kind of pet to buy.



What does the salesman recommend?

[A] A dog
 [B] A cat
 [C] A rabbit
 [D] A fish

2. Listen

Click the **Play audio** button. There will be a pause before the audio begins. (If the Web is busy and pauses are long, you may prefer to click **Play audio** first, then read the intro and question.)

YOU MAY LISTEN TO EACH DIALOGUE TWO TIMES. You will not have time to finish if you play dialogues more than twice.

3. Select answer

- Click the circle in front of your choice of A, B, C, or D, then...
- ...click **Submit answer**. **BE CAREFUL** -- don't click **Submit answer** before choosing an answer! You cannot go back.

3.6.2 Procedure and data collection

Participants were seated alone at a computer in a sound-attenuated room in a lab and were instructed to wear a set of AKG K77 headphones. A brief tutorial in English script instructed participants to look at the picture and read the comprehension question and possible answers before listening to the dialog. Participants were then instructed to press a key to hear each dialog with an option to hear it a second time before selecting an answer to the comprehension question. Once an answer was selected, the software automatically advanced to a

new screen containing the image and comprehension question that corresponded to the next dialog.

The CoLA software automatically scored and registered participants' accuracy on this task. Possible scores range from 0 in the event that none of the items were answered correctly, and 35 if all the items were answered correctly. A detailed discussion of the result of this task as they related to participant selection and research question 1 is included in Chapter 4.

3.7 Elicited Imitation Task

Research Question 2: How do Spanish RHBs perform on an aural task measuring global Spanish language proficiency?

The elicited imitation task (Vinther, 2002) is a psycholinguistic technique in which a participant is presented with an utterance and is asked to repeat it. The researcher then analyzes the repetition and makes inferences about the participant's knowledge of the language (Bley-Vroman & Chaudron, 1994). Elicited imitation has been previously used to test both L2 competence (Erlam, 2006; Tracy-Ventura, McManus, Norris & Ortega, 2014) and Spanish heritage language competence (Zamora, 2015). The purpose of utilizing this task in the current research was to assess Spanish RHBs' level of proficiency in Spanish in a way that was appropriate for their particular language abilities and for which currently no standardized assessment measures exist (Sherkina-Lieber, 2011; Zamora, 2015). Assessment of proficiency in previous studies of heritage bilinguals has often relied on tools such as the Diplomas of Spanish as a Foreign Language test (the DELE, developed by the Instituto de Cervantes in Spain), the Modern Language Association Proficiency Exam, or the ACTFL standards for various domains

of the language. These assessment measures are problematic for receptive bilinguals in two ways: the first is that they were developed to test the proficiency of individuals who have learned Spanish as a second language, and whose language learning background and histories are very different from those of heritage bilinguals. They often test metalinguistic knowledge that is imparted in L2 language classrooms but would not be taught explicitly to Spanish RHBs as children. The second is that portions of these assessments, and in particular the DELE and MLA tests, utilize written materials which require the test takers to have possess reading/literacy skills in Spanish. Heritage bilinguals most often receive formal schooling in English, and while their oral and receptive skills may be well-developed, they have not developed advanced reading and writing abilities in Spanish. For these reasons, an alternate proficiency assessment tool that is both domain-specific (aural) and reliant on receptive rather than productive language skills is most appropriate for the Spanish RHBs in this study.

During this task participants listened to and repeated pre-recorded sentences of increasing length and syntactic complexity in Spanish. Studies in which the proficiencies of more advanced heritage bilinguals (Zamora, 2015), and L2 Spanish learners (Bowden, 2016) were evaluated using this same elicited imitation task revealed that proficiency scores correlated with those of the DELE test and a simulated oral proficiency interview. Bowden (2016) also confirmed the elicited imitation task's internal reliability, discriminatory power, and ability to identify subgroups of learners within a given testing pool. The reliability of this task has furthermore been demonstrated based on its correlation with other measures, such as parental reports of proficiency and correlations between elicited imitation tasks and grammaticality judgment tasks (Sherkina-Lieber, 2011 p. 106).

3.7.1 Materials

The rationale that underlies the elicited imitation task is that participants will only be able to accurately repeat the sentences if they have parsed the sentence through their grammatical system (Bowden, 2016). The specific elicited imitation task used in this study contains sentences originally developed by Ortega, Iwashita, Rabie, & Norris (1999) and modified by Bowden (2016) to be more appropriate for speakers of Mexican versus Peninsular Spanish. The task is comprised of thirty sentences presented aurally in their entirety, which gradually increased in length from 7 syllables at the beginning to 17 syllables at the end of the task (see Appendix D for a list of the sentences). The sentences were structured so that as syllable count increases, sentence length eventually exceeds working memory capacity to prevent participants from simply “parroting” back the stimuli without actually processing the sentence.

To develop this task, the sentences were recorded by a balanced bilingual speaker of Southwest US Spanish in a sound-attenuated room. Recordings were captured using a Fostex DC-R302 3-Channel Audio Mixer and Stereo Recorder, and Shure SM10A Headworn Microphone. Once recorded, amplitude was normalized across all sentences utilizing the Audacity software and the timing of the presentation of each sentence was standardized using the PsychoPy software program. The task was programmed so that each sentence would be presented aurally, immediately followed by a pause of 2 seconds and then a ring tone of 0.5 seconds. This ring tone indicated to participants that they should then repeat the sentence. The purpose of the pause and ring tone was to further guard against participants quickly echoing back the sentences rather than actually processing and reproducing them (Ortega, et al., 1999).

3.7.2 Procedure and data collection

The procedure for this task followed that of Zamora (2015) and Bowden (2016). Participants were seated alone at a computer in a quiet room in a lab and were instructed to wear a set of AKG K77 headphones. PsychoPy software was utilized to present the task, which began with instructions in English script followed by two audio practice sentences in Spanish of 7 syllables each. These were then followed by the 30 test items. Instructions in English script asked participants to listen carefully to each sentence and to repeat it to the best of their ability. Participants were given the option to hear each sentence a second time before repeating it, although listening opportunities were limited to two for each sentence.

Participant responses were collected using a Fostex DC-R302 3-Channel Audio Mixer and Stereo Recorder, and Shure SM10A Headworn Microphone. Responses were later coded using the rating criteria developed by Ortega (2000) (see Appendix E). Ratings for each sentence were dependent on the completeness of the idea units that were reproduced by participants, as well as the structural similarity between what participants heard and repeated. Two raters, both L1 speakers of Southwest Spanish, scored each elicited imitation test independently. A third rater, a balanced bilingual speaker of Southwest Spanish and English, reconciled any differences between the scores. Each sentence was assigned a rating between 0-4, and overall performance on the 30 test items ranged from 0 to 120. A detailed discussion of the results of this task is provided in Chapter 4.

3.8 Self-paced Aural Grammaticality Judgment Task

Research Question 3: Are Spanish RHBs sensitive to morphosyntactic well-formedness in spoken Spanish, and to what degree?

- a. How does sensitivity to grammaticality vary between morpheme conditions?
- b. What might account for variation between morpheme conditions?

Grammaticality judgment tasks are designed to explore intuitions about structures are acceptable in a bilinguals' grammar. The theoretical underpinning of these tasks is that participants' performance will "map the territory lying between the target language grammar, and the learner's developing grammar" (Munnich, Flynn & Martohardjono, 1994, p. 227). The purpose of this task in the current research was to determine how sensitive Spanish RHBs are to violations of morphosyntactic well-formedness. Whether or not Spanish RHBs hear errors in spoken Spanish and the degree to which they are able to identify grammatically correct and incorrect utterances provides a measure of what structures are permissible in these bilinguals' grammars. This task measured participants' sensitivity to morphological errors in two ways: the first is by utilizing a follow up question after all test items asking whether the sentence sounded "right" or not to the participant. When subjects correctly answer yes to grammatical items and no to ungrammatical items, it is assumed that they have access to the underlying rules that govern the well-formedness of the structure being tested. Conversely, incorrect responses indicate a lack of access to these rules (Munnich et al., 1994; Sherkina-Lieber, 2011). The second way sensitivity to grammaticality is tested is by comparing the relative speed of listening times corresponding to grammatical versus ungrammatical target items. Similar to self-paced moving window reading methodology, longer listening times for ungrammatical morphemes in minimal

sentence pairs is interpreted as an indication that the participant has noticed an error, and that their listening time slowed as a result of the difficulty in processing the ungrammatical item (Bley-Vronman & Masterson, 1989; Marinis, 2003). Longer listening times for ungrammatical items are expected to correspond to “no” answers to the follow up question “Does this sentence sound right to you?⁹”, and faster listening times are expected to correlate to “yes” answers. Determining what structures are and are not allowable in Spanish RHBs grammars will therefore shed light on the access that these bilinguals have to the underlying rules that govern these morphological structures.

This task consisted of randomized grammatical/ungrammatical sentence pairs in Spanish which were presented to participants aurally. All sentences were segmented into three phrases at major syntactic phrase boundaries (by noun phrases, verb phrases, prepositional phrases, and adverbial phrases). Sentences were presented in a phrase-by-phrase manner and the length of time spent listening to each phrase was controlled by the participant. The sentence pairs were identical except for the target morphological structure being tested, which was manipulated so that for any given sentence pair one was grammatical and the other was ungrammatical. If these morphemes do not form part of these bilinguals’ grammars, then they are expected to accept all sentences and perform at or below chance when indicating whether a sentence sounds “right” to them (Au et al., 2002, 2008; Sherkina-Lieber 2011). Additionally, there should be no difference in listening times between the phrases containing the grammatical morphemes and those containing the ungrammatical morphemes. If, on the other hand Spanish RHBs do have receptive

⁹ Participants were asked whether the sentences sounded “right” to them rather than whether the sentences sounded “grammatical”, to avoid reliance on metalinguistic knowledge and to prevent the purpose of the task from being revealed.

and intuitive knowledge of what constitutes allowable syntactic structure in Spanish, then they are expected to perform above chance when indicating whether the sentence sounds right to them. Likewise, listening times should differ between grammatical and ungrammatical target phrases. Differences in listening times and accuracy scores between morphological conditions provide an indication as to the structures whose acquisition may be more vulnerable in childhood, and those which may be most affected by various language background factors.

It is important to note that aural grammaticality judgment tasks involve processes other than those related strictly to grammatical processing. These include working memory capacity as well as phonological decoding of and lexical access to the words presented in the stimuli. While working memory span has been found to correlate with performance on grammaticality judgments in populations of L2 learners (McDonald, 2006), test items were designed so that they contained high frequency lexemes and did not exceed fifteen syllables in order to limit the possible effects of working memory on the results.

3.8.1 Materials

The morphological conditions were chosen based those tested in Beaudrie's 2006 study, which highlighted the linguistic development and challenges faced by a population of Spanish HRBs at the beginning and end of an academic semester. A total of 100 items were created which included four practice items, 80 experimental items distributed equally across 5 morphological conditions, and 16 distractor items. The test items consisted of pairs of sentences that were identical except for the target morpheme. Target morphemes were manipulated so that each sentence pair consisted of one grammatical and one ungrammatical target morpheme. (See Appendix F for the complete list of stimuli). The morphological conditions are listed below, and

examples for each condition are provided in the sections that follow. All morphological conditions correspond to those structures taught in a first-semester Spanish for heritage learners course (Beaudrie, 2006).

1. Gender agreement
2. Subject/verb agreement
3. Tense (present versus preterit distinctions)
4. Aspect (preterit versus imperfect distinctions)
5. Mood (present indicative versus present subjunctive distinctions)
6. Distractor condition

Each condition was comprised of 16 test items, half of which were grammatical and the other half of which were ungrammatical. Sentence pairs were designed so that the target morpheme was located in phrase 2 for half the items, and in phrase 3 for the other half of the items. The distractor condition was comprised of sentences similar in structure to the test items, although participants answered a multiple-choice comprehension question related to the content of what they heard rather than indicate its acceptability. The motivation behind the distractor condition was to minimize the risk that participants would respond to test items randomly by requiring that they periodically attend to the meaning of what they heard.

Sentences were generated with the assistance of 2 monolingual and 3 balanced bilingual Spanish language consultants and were revised for errors and to ensure that no dialect-specific lexical items or syntactic structures were included. Additionally, fixed phrases that could potentially be stored as a whole were avoided. In order to diminish the risk that other unfamiliar elements, such as vocabulary items, would confound the results of the task, the phrase in which

the target morpheme was located in each sentence was controlled for frequency and only high-frequency lexemes were utilized. To set frequency parameters, all available transcripts from the *Corpus del Español en el Sur de Arizona* (Carvalho, 2012) were entered into a word frequency calculator (www.wordcounter.com). Only those lexemes appearing in a list of the first 1 - 1,000 most common words were used in the target areas of the experimental sentences.

All items were audio recorded by a balanced bilingual speaker of Southwest US Spanish in a sound-attenuated room. Recordings were captured using a Fostex DC-R302 3-Channel Audio Mixer and Stereo Recorder, and Shure SM10A Headworn Microphone. Once recorded, amplitude was normalized across all sentences, and each was segmented into three phrases using Audacity. The task was programmed using PsychoPy software so that all sentences, including the distractor items, were presented randomly to participants. Sample items for each experimental condition are listed below, and as was previously mentioned, a complete list of the experimental conditions can be found in Appendix F.

1. Gender agreement: target morphology in the gender agreement condition included both article - noun concord and noun - adjective concord. All nouns were canonical, with prototypical *-o* masculine-ending nouns and adjectives, and *-a* feminine ending nouns and adjectives. Previous studies (Montrul, 2011; Montrul et al., 2008; Montrul, Davidson De la Fuente & Foote, 2014) have found that for Spanish heritage bilinguals, accuracy is higher and processing is facilitated for canonical versus non canonical nouns. Because the Spanish RHBs are less proficient in this study than they were these previous studies and in order to keep the number of test items reasonable, only canonical nouns were tested. For all of the test items in this condition, half of

the target structures were masculine, and the other half were feminine. Examples (a) – (d) below illustrate how the sentences were structured.

(a).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>			<u>Target</u>
En la noche	mi papá	cierra	la	*el	puerta <i>fem article</i>
At night	my father	closes	the _{fem}	*the _{masc}	door _{fem}

(b).

<u>Phrase 1</u>	<u>Phrase 2</u>		<u>Phrase 3</u>		<u>Target</u>
Se vende	la	casa	bonita	*bonito	en la esquina <i>fem adjective</i>
Is for sale	the _{fem}	house _{fem}	pretty _{fem}	*pretty _{masc}	on the corner

(c).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>			<u>Target</u>
Anoche	se quebró	el	*la	teléfono	<i>masc article</i>
Last night	broke	the _{masc}	*the _{fem}	telephone _{masc}	

(d).

<u>Phrase 1</u>	<u>Phrase 2</u>		<u>Phrase 3</u>		<u>Target</u>
En la mañana	el	perro	chiquito	*chiquita	come mucho <i>masc adjective</i>
In the morning	the _{masc}	dog _{masc}	small _{masc}	*small _{fem}	eats a lot

2. Subject/verb agreement: target morphology in this condition included person and number agreement inflected on the verb, which was dependent on the subject antecedent established in a phrase earlier in the sentence. The ungrammatical conditions were selected so that they contrasted phonologically with the grammatical condition, and so that both conditions contained the same number of syllables so that reaction time differences were not due to variable utterance length between the grammatical and ungrammatical conditions. Examples (e) – (f) below illustrate how the sentences were structured.

(e).

<u>Phrase 1</u>	<u>Phrase 2</u>		<u>Phrase 3</u>	<u>Target</u>
Mis tíos	comen	*como	en el restaurante	<i>3rd person plural</i>
My aunts/uncles _{S3rdpplural}	eat_{3rdpplural}	*eat_{1stpsing}	in the restaurant	

(f).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>		<u>Target</u>
En el trabajo	yo	hablo	*hablas	mucho <i>1st person singular</i>
At work	I _{1stpsing}	talk_{1stpsing}	*talk_{2ndpsing}	a lot

3. Tense (present versus preterit distinction): target morphology in this condition included present versus preterit morphology matches and mismatches based on time references established by adverbs earlier in the sentence. Half of the items in this condition tested present tense morphology and half of the structures tested past tense morphology. Additionally, half the items were grammatical and half were ungrammatical. Target items were also balanced between

the second and third phrases of the test items. Examples (g) – (h) below illustrate how the sentences were structured.

(g).

<u>Phrase 1</u>	<u>Phrase 2</u>			<u>Phrase 3</u>	<u>Target</u>
Ahora mismo	mi abuela	cocina	*cocinó	con la familia	<i>Present tense</i>
Right now _{pres}	my grandmother cooks_{pres}		*cooked_{past}	with the family	

(h).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>			<u>Target</u>
El mes pasado	durante las vacaciones	fuimos¹⁰	*vamos	a la playa	<i>Preterit tense</i>
Last month _{past}	during vacation	we went_{past}	*we go_{pres}	to the beach	

4. Aspect (preterit versus imperfect distinction): target items in this condition tested knowledge of past tense/aspect morphology; specifically preterit morphology with achievement verbs and imperfect morphology with stative verbs or habitual actions in the past. While both the preterit and the imperfect can appear in each of Vendler’s (1967) four lexical predicates classes, the sentences were constructed so that the context provided by the sentence resulted in one of the readings in each sentence pair being grammatical, and the other being illogical or sounding awkward. Half of the target structures were located in phrase 2, and half in phrase three.

Examples (i) – (j) below illustrate how the sentences were structured.

¹⁰ Irregular forms used appeared as one of the 1,000 most common lexemes sourced from the *Corpus del Español en el Sur de Arizona* which were used in the target area of the experimental sentences.

(i).

<u>Phrase 1</u>	<u>Phrase 2</u>		<u>Phrase 3</u>	<u>Target</u>
Mis hermanos	nacieron (achievement)	*nacían	en San Diego	<i>Preterit aspect</i>
My brothers	were born_{pret}	*were born_{imp}	in San Diego	

(j).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>			<u>Target</u>
Cada año	en mi cumpleaños	yo bailaba (habitual)	*bailé	mucho	<i>Imperfect aspect</i>
Every year	on my birthday	I danced_{imp}	*I danced_{pret}	a lot	

5. Mood (present indicative versus present subjunctive distinction): target items in this condition tested included mood morphology related to realis/irrealis suppositions of doubt versus certainty. In each test item, the verb carrying the inflected morpheme for mood is embedded in a subordinate noun clause. These noun clauses are governed by verb phrases in the main clause of either truth/certainty, or doubt/negation. Test items communicating truth or certainty require the indicative in the subordinate noun clause. Conversely, those communicating doubt or negation require the subjunctive in the subordinate noun clause. Examples (k) – (l) below illustrate how the sentences were structured.

(k).

<u>Phrase 1</u>	<u>Phrase 2</u>			<u>Phrase 3</u>	<u>Target</u>
Es cierto	que la tienda	queda	*quede	muy lejos	<i>Indicative mood</i>
It is true	that the store located_{subj}	is located_{ind}	*is	very far away	

(l).

<u>Phrase 1</u>	<u>Phrase 2</u>	<u>Phrase 3</u>		<u>Target</u>
Las niñas	no creen que	la comida sea	*es buena	<i>Subjunctive mood</i>
The little girls	don't believe that	the food	i_{subj} *i_{ind} good	

3.8.2 Procedure and data collection

Participants were seated alone at a computer in a quiet room in a lab and were instructed to wear a set of AKG K77 headphones. PsychoPy software was used to present this task which included text instructions, practice items, and randomized experimental and distractor items. All instructions were presented in English script and all practice, experimental, and distractor items were presented as audio files in Spanish. Participants used the space bar on a computer keyboard to progress consecutively through the three sound files that comprised each test item/sentence. Instructions asked participants to work as quickly as possible, but to listen carefully to each segmented sentence, even if it sounded similar to something they had heard before. After hearing each sentence in its entirety, the spacebar was again used to progress to a follow up question,

which was presented in English script. After each experimental item, participants were asked whether or not the sentence sounded “right” to them or not, and responses were indicated using the ‘Y’ and ‘N’ keys on the keyboard. After distractor items participants were presented with a comprehension question pertaining to information stated in the distractor sentence. The comprehension question included four possible numbered answers (1 correct, 3 incorrect). Keys 1-4 on the keyboard were used to choose a response. This experimental task was structured so that participants began with four practice items before proceeding to the experimental and distractor items which were presented randomly.

Listening times and accuracy scores were recorded using PsychoPy software. Listening times were measured from the onset of each sound file (from the time the participant pressed the space bar to hear a given phrase), to the moment in which the spacebar was pressed again to hear the following phrase or to proceed to the follow up question. Responses and the accuracy of the grammaticality judgment question itself (“Does this sentence sound ‘right’ to you?”) were also recorded. Accuracy scores and listening times were analyzed both independently and in conjunction with one another. A detailed discussion of the results is included in Chapter 4.

3.9 Aural Morpheme Interpretation Task

Research Question 4: Do Spanish RHBs extract meaning from bound morphemes in spoken Spanish?

- a. How does the ability to interpret morphemes for meaning vary across morpheme conditions?
- b. What might account for variation between morpheme conditions?

While the global comprehension task establishes that receptive bilinguals do have measureable receptive skills and the self-paced grammaticality judgment task indicates whether Spanish RHBs are sensitive to the grammaticality of morphemes, neither of these tasks directly measures whether or not receptive bilinguals process the meaning supplied by morphemes when listening to Spanish. The aural morphology interpretation task (Sherkina-Lieber, 2011) was designed to assess knowledge of this meaning. This is accomplished by testing the comprehension of sentences that are ambiguous unless the target morpheme is processed. The goal of this task is therefore to determine whether the processing of these functional morphemes forms part of receptive bilinguals' underlying grammatical competence. Additionally, the patterns and accuracy in which they are processed may shed light on potential sources of difficulty in comprehension that could impede full comprehension of spoken Spanish. The same morphological conditions tested in the aural self-paced grammaticality judgment task were tested in the morpheme comprehension task.

3.9.1 Materials

This task consisted of 72 test items (36 pairs of sentences) and 14 distractor items, for a total of 86 items. The test items were divided among 5 different target morpheme conditions in the following way: gender condition (24 items: 12 in which gender was assigned by the article, and 12 in which gender agreement was marked on the adjective), grammatical person (12 items), tense condition (12 items), aspect condition (12 items), and mood condition (12 items). Every sentence was followed by a comprehension question in English script related to the content of the sentence. (See full list of stimuli in Appendix F). These sentences were constructed so that the correct interpretation of the sentence was dependent on the processing of the target

morpheme. This processing was tested in two ways. The first is that if the target morphological structures are not processed, the information in the sentence will be ambiguous and participants will not be able to answer the comprehension question with a definitive, correct answer. The second way morphological processing is tested is by designing the test items so that morphological contrasts were tested in each morpheme class. For example, in the gender agreement condition, one sentence of a given minimal pair was constructed so that the listener should process the female gender interpretation of the sentence, and the other would result in interpretation of masculine gender. Distractor items were structured so that they were ambiguous, with corresponding correct answers to the comprehension questions also indicating their ambiguity. This was done so that the correct response to some of the items was that they were in fact ambiguous. It was hoped that this would minimize the risk that participants would simply guess in the event that a test item seemed ambiguous, rather than choosing the ambiguous option from the list of the potential answers.

As in the self-paced aural grammaticality judgment task, test items were generated with the assistance of 2 monolingual and 3 balanced bilingual Spanish-English language consultants. All five consultants revised the items for errors and to ensure that no dialect-specific lexical items or syntactic structures were included. Additionally, fixed phrases that could potentially be stored as a whole were avoided. For each sentence, the lexeme carrying the morphological marker was sourced from the same list of the 1,000 most frequent items from the *Corpus del Español en el Sur de Arizona* (Carvalho, 2012) which was generated for the self-paced aural grammaticality judgment task. A sampling of the items in each condition is as follows:

1. Gender: Items in the gender condition included sentences in which the otherwise ambiguous subject of a sentence is determined via noun-adjective concord (all canonical nouns), as well as sentences in which the interpretation of masculine and feminine direct articles disambiguates non-canonical subject nouns. An example of each is shown in (a) – (b) below.

Test item	Follow up question	Target morpheme
<p>(a) En el centro de la ciudad, la_{fem} / el_{masc} artista está pintando un mural.</p> <p>In the center of the city, the_{fem} / the_{masc} artist is painting a mural.</p>	<p>According to the sentence, who is painting a mural?</p> <p>A. It's not clear from the sentence</p> <p>B. A female artist</p> <p>C. A male artist</p> <p>D. Both a male and female artist</p>	<p><i>fem / masc article</i></p>
<p>(b) Angela está estudiando con Marcos para la prueba. Está muy preocupada_{fem} / preocupado_{masc}.</p> <p>Angela is studying with Marcos for the test. Is very worried_{fem} / worried_{masc}.</p>	<p>According to the sentence, who is very worried?</p> <p>A. Angela</p> <p>B. Marcos</p> <p>C. Both of them</p> <p>D. It's not clear from the sentence</p>	<p><i>fem / masc noun-adj concord</i></p>

2. Grammatical person: In this condition first person singular versus plural, and third person singular versus plural are targeted. Second person was not tested for two reasons. The first was limit the number of test items so that the task is not overwhelming to the participants. The second was that as discussed in Chapter 3, first and third grammatical person emerge before others in childhood. Samples of test items in the grammatical person condition are shown in (c) – (d)

below.

Test item	Follow up question	Target morpheme
<p>(c) Estudio^{1stper-sing} / Estudiamos^{1stper-plural} para el examen en la biblioteca.</p> <p>I study^{1stper-sing} / We study^{1stper-plural} for the exam in the library.</p>	<p>According to the sentence, who studies in the library?</p> <p>A. We do B. You do C. I do D. It's not clear from the sentence</p>	<p><i>first person-sing / plural</i></p>
<p>(d) Cada viernes toca^{3rdper-sing} / tocan^{3rdper-sing} la guitarra en un bar.</p> <p>Every Friday (he/she) plays^{3rdper-sing} / (they) play^{3rdper-plural} the guitar en a bar.</p>	<p>According to the sentence, who plays the guitar on Fridays?</p> <p>A. It's not clear from the sentence B. No one C. More than one person D. One person</p>	<p><i>third person-sing / plural</i></p>

3. Tense: Items in the tense condition test whether or not participants process the morphological markers that establish a time reference in the present versus the preterit. Although these tenses are acquired early in childhood, low-proficiency heritage bilinguals have been shown to rely heavily on the present tense versus other tenses in production tasks (Beaudrie, 2006). This condition tests whether or not receptive bilinguals process both the present tense and the past tense equally, or whether the present tense is also favored in perception tasks. More specifically, the present tense indicating habitual actions is contrasted with the preterit tense referring to a

completed action in the past. Grammatical person was limited as in the previous conditions.

Examples of items in the tense condition are shown in (e) – (g) below:

Test item	Follow up question	Target morpheme
<p>(e) Por la tarde, yo duermo_{pres} / dormí_{pret} dos horas.</p> <p>In the afternoon, I sleep_{pres} / slept_{pret} two hours.</p>	<p>According to the sentence, when do I sleep two hours?</p> <p>A. I will sleep in the future</p> <p>B. I slept in the past</p> <p>C. I regularly sleep two hours</p> <p>D. It's not clear from the sentence</p>	<i>present / preterit</i>
<p>(f) Ana trabaja_{pres} / trabajó_{pret} en una tienda de ropa.</p> <p>Ana works_{pres} / worked_{pret} in a clothing store.</p>	<p>According to the sentence, when does Ana working in a clothing store?</p> <p>A. She worked there in the past</p> <p>B. She will work there in the future</p> <p>C. She currently works there</p> <p>D. It's not clear from the sentence</p>	<i>present / preterit</i>
<p>(g) Para hacer ejercicio, ellos caminan_{pres} / caminaron_{pret} tres millas.</p> <p>To exercise, they walk_{pres} / walked_{pret} three miles.</p>	<p>According to the sentence, when do they walk three miles?</p> <p>A. They will walk in the future.</p> <p>B. They walked in the past</p> <p>C. They regularly walk three miles</p> <p>D. It's not clear from the sentence</p>	<i>present / preterit</i>

4. Aspect: Items in the aspect condition contrasted past tense verbs in the imperfect and the preterit. Items in the imperfect condition referred to habitual actions in the past, and items in the preterit referred to a completed action in the past. Grammatical person was once again limited to first and third person singular and plural. Examples of items in the aspect condition are shown in (h) – (i) below:

Test item	Follow up question	Target morpheme
<p>(h) El semestre pasado, yo llegué_{pret} / llegaba_{imper} tarde a la clase de español.</p> <p>Last semester, I arrived_{pret} / arrived_{imper} late to Spanish class.</p>	<p>According to the sentence, how often did I arrive late to class last semester?</p> <p>A. It's not clear from the sentence B. Never C. Regularly in the past D. One time in the past</p>	<i>preterit / imperfect</i>
<p>(i) Durante las vacaciones, los niños fueron_{pret} / iban_{imperf} a la casa de sus abuelos.</p> <p>During vacation, the children went_{pret} / went_{imperf} to their grandparents' house.</p>	<p>According to the sentence, when did the children go to their grandparents house?</p> <p>A. It's not clear from the sentence B. Never C. Regularly in the past D. Once in the past</p>	<i>preterit / imperfect</i>

5. Mood: Items in the mood condition contrasted present tense indicative and subjunctive mood morphemes. More specifically, these items test differences in meaning between indicative morphemes referring to definite or known antecedents, and subjunctive morphemes indicating

that the antecedent is indefinite or unknown. Items in the mood condition are shown in (k) – (l) below:

Test item	Follow up question	Target morpheme
<p>(k) La policia busca una casa que tiene_{indic} / tenga_{subj} una puerta roja</p> <p>The police look for a house that ha_{indic} / ha_{subj} a red door.</p>	<p>According to the sentence, what are the police looking for?</p> <p>A. It's not clear from the sentence</p> <p>B. Whether there is a house with a red door - they don't have a specific one in mind</p> <p>C. A specific house with a red door</p> <p>D. None of these</p>	<p><i>indicative / subjunctive</i></p>
<p>(l) Los hombres buscan un bar que está_{indic} / esté_{subj} en el centro.</p> <p>The men look for a bar that is located_{indic} / located_{subj} in the city center.</p>	<p>According to the sentence, what are the men looking for?</p> <p>A. Whether there is a bar in town - they don't have a specific one in mind.</p> <p>B. It's not clear from the sentence</p> <p>C. A specific bar in town</p> <p>D. None of these</p>	<p><i>indicative / subjunctive</i></p>

The sentences were audio recorded by a balanced bilingual speaker of Southwest US Spanish in a sound-attenuated room. Recordings were captured using a Fostex DC-R302 3-Channel Audio Mixer and Stereo Recorder, and Shure SM10A Headworn Microphone. Once recorded, amplitude was normalized across all sentences using Audacity, and the experimental task was programmed in Psychopy so that items were presented randomly to participants.

3.9.2 Procedure and data collection

Participants were seated alone at a computer in a quiet room in a lab, and were instructed to wear a set of AKG K77 headphones. PsychoPy software was utilized to present this task which included text instructions, practice items, and randomized experimental and distractor items. All instructions were presented in English script, and all practice, experimental, and distractor items were presented as audio sound clips in Spanish. Participants used the space bar on a keyboard to progress through the test items. Participants were instructed to listen carefully to each sentence, even if it sounded like something they had heard before, and to answer each corresponding comprehension question to the best of their ability. The task was programmed so that participants pressed the space bar to hear each mini story, and once the audio file concluded the comprehension question in English script automatically appeared. Participants used the A, B, C and D keys on a keyboard to enter their answers to the comprehension questions before proceeding to the following sentence. Accuracy scores were recorded using the PsychoPy software. A detailed discussion of the results is included in Chapter 4.

3.10 Biographical Questionnaire

A questionnaire was developed and administered to gather information about participants' language histories as well as self-assessments of their current language skills in Spanish. The questionnaire was developed and administered online, and participants completed it from home.

3.10.1 Materials

The questionnaire was developed by consulting the National Heritage Language Research Institute's "Bilingual background questionnaire for Spanish/English speakers" (Montrul, 2012b) and a questionnaire developed Child (2013). Portions of the questionnaire reported in this research were divided into five different categories and contained 38 questions in total. These questions were developed and organized using the Qualtrics software program, which was also utilized to administer the questionnaire to participants (See Appendix G for the questionnaire). Participants answered questions in categories relating to personal data, family history, childhood language history, elementary school language history, and current linguistic proficiency (self-assessed). The following table indicates how the question items were distributed among these different categories.

Table 3-5: Biographical questionnaire items by category

Category	Items
Personal Data	1 – 9
Family history	10 – 15
Childhood language history	16 – 28
Elementary school language history	29 - 32
Current self-assessed linguistic proficiency	33 – 38

Results of the questionnaire were used to compile descriptive profiles of the Spanish RHBs and well as to determine the types of input these bilinguals received during childhood.

3.10.2 Procedure and data collection

Participants worked through the questionnaire at home and at their own rate. Participants were emailed a link to the questionnaire as well as their individualized participant ID, which was

required to access the questionnaire. Participants' responses were registered and stored automatically by the Qualtrics software system and were later exported for data analysis. The results of the questionnaire are detailed in section 3.4 above.

3.11 Analysis of Data and Comparison of Tasks:

3.11.1 Analysis of data

As described previously in this chapter, participants completed a biographical questionnaire and four experimental tasks, which included a contextualized listening comprehension task, an elicited imitation task, an aural grammaticality judgment task, and an aural morpheme interpretation task. The type of data that was collected and analyzed for each task is summarized in the following table:

Table 3-6: Data collected for each experimental task

Task	Data Collected
Contextualized listening comprehension task	Overall accuracy scores by participant, range 0-35
Elicited imitation task	Accuracy scores by participant, range 0-120
Aural grammaticality judgment task	1) Listening times by participant and morphological condition measured in milliseconds 2) Accuracy scores (binary, yes/no) by participant and morphological condition, range 0-100%
Aural morpheme interpretation task	Accuracy scores (multiple choice) by participant and morphological condition, range 0-100%
Biographical questionnaire	Qualitative and quantitative responses related to participant language history

The data from each task was analyzed using the following statistical programs and tests (a detailed description of the results is given in Chapter 5):

Contextualized listening comprehension task: A single, numeric accuracy score was calculated by the software program for each participant for this task. These scores were entered into SPSS Statistics for Mac, version 24.0 (SPSS Inc., Chicago, Ill., USA), in order to generate descriptive statistics. Additionally, a one-way analysis of variance (ANOVA) was conducted to determine whether there were statistical differences between the mean scores of the Spanish RHB group, and those of the advanced heritage bilingual and monolingual control groups.

Elicited imitation task: A single, numeric accuracy score was calculated in accordance with specific rating criteria. These scores were entered into SPSS to generate descriptive statistics. Also, a one-way ANOVA was conducted to determine whether there were significant differences between the mean scores of the Spanish RHB group, and those of the advanced bilingual and monolingual control groups.

Aural grammaticality judgment task: Responses (binary yes/no responses) and listening times for each test item, morphological condition, and participant group were analyzed using R statistical software (R Core Team, 2016). Due to the multiple data points collected for every participant, mixed effects modeling was used to analyze the data. This type of statistical modeling has been shown to be more conservative and less prone to Type I errors (rejecting a true, null hypothesis) than conventional ANOVAs (Quené & Van den Bergh, 2008). Accuracy,

reaction times, and the relationship between accuracy and reaction times were examined by participant group and morphological condition.

Aural morpheme comprehension task: Accuracy scores by participant and morphological condition were analyzed using R statistical software (R Core Team, 2016). Accuracy scores were examined by participant group and morphological condition.

Biographical Questionnaire: Quantitative and qualitative questionnaire data was exported into and analyzed by SPSS and Microsoft Office Excel (2017). Both of these programs were used to calculate percentages and tabulate the qualitative data.

3.11.2 Correlations between tasks

Research Question 5: What do correlations between the experimental tasks suggest about the interrelatedness of the skills and knowledge that they evaluate?

Research Question 6: What characterizations of heritage language grammars best represent the language skills of Spanish RHBs?

Once the data was analyzed for each individual laboratory task an analysis was conducted to measure correlations between them. To do this, a main or representative measure for each task first had to be determined. These measures are given in Table 3-7 below:

Table 3-7: Representative measure for each laboratory task

Task	Measure utilized
Contextualized listening comprehension task	Accuracy score by participant
Elicited imitation task	Accuracy score by participant
Aural grammaticality judgment task	Mean accuracy scores across all conditions
Aural morpheme interpretation task	Mean accuracy scores across all conditions

A Spearman’s rank correlation was then tested in SPSS to measure the strength of association between the four experimental tasks. These were then analyzed to determine what differences between them might suggest about the interrelatedness of the skills that each task measured, which addresses research question 5. While no statistical analyses were utilized per se to answer research question 6, the results of this study were rather considered holistically. A discussion of the results as they relate to research questions 5 and 6 is given in Chapter 4.

3.12 Conclusion

This chapter detailed the procedures followed while carrying out the data collection portion of this research including subject recruitment, the creation and administration of the experimental tasks, and the types of statistical tests used to analyze the data. A detailed description of the subjects is provided along with the criteria used to define the subject groups. Additionally, the procedure for each experimental task is presented in tandem with the research question that the task was designed to answer. In the following chapter, a detailed analysis of the results for each of the experimental tasks is provided.

CHAPTER 4 – RESULTS

4.1 Introduction

In this chapter I present the findings of each of the experimental tasks as they relate to the research questions guiding the study. The purpose of this study was to determine the nature of the underlying grammatical knowledge that Spanish RHBs possess and the grammatical forms that Spanish RHBs process for meaning when listening to spoken Spanish with a focus on morphology. The research questions, which were introduced in Sections 1.5.1 and 3.2 of the previous chapters, have been included again for reference. The empirical findings that address these questions are presented in the sections that follow.

4.2 Research Questions

Research Question 1: How accurately are Spanish RHBs able to extract meaning from aurally presented, conversational Spanish?

Research Question 2: How do Spanish RHBs perform on an aural task measuring global Spanish language proficiency?

Research Question 3: Are Spanish RHBs sensitive to morphosyntactic well-formedness in spoken Spanish, and to what degree?

- a. How does sensitivity to grammaticality vary between morpheme conditions?
- b. What might account for variation between morpheme conditions?

Research Question 4: Do Spanish RHBs extract meaning from bound morphemes in spoken Spanish?

- a. How does the ability to interpret morphemes for meaning vary across morpheme conditions?
- b. What might account for variation between morpheme conditions?

Research Question 5: What do correlations between the experimental tasks suggest about the interrelatedness of the skills that they evaluate?

Research Question 6: What characterizations of heritage language grammars best represent the language skills of Spanish RHBs?

While a limited number of studies have examined the language abilities of heritage bilinguals with profiles similar to those of the Spanish RHBs in this study (Beaudrie, 2006, 2009a; Au et al., 2002, 2008; Sherkina-Lieber, 2011; Sherkina-Lieber et al., 2011), all have utilized experimental methods that require that the participants have either productive or literacy skills in Spanish. To account for the limited literacy skills and absence of speech production that characterizes the Spanish RHBs in this study, I have designed a methodology that tests their language skills using stimuli which is presented entirely aurally.

This methodology, modeled in part after Sherkina-Lieber's 2011 study of receptive bilinguals of Labrador Inuttitut, examines both the global language abilities of Spanish RHBs (how well they understand spoken Spanish, and how proficient they are in the language), as well as their implicit knowledge of grammatical well-formedness and their ability to process and interpret morphemes for meaning. The overarching goal of this study is to gain a more detailed

picture of the language skills that Spanish RHBs possess, including insight into the grammatical system of heritage bilinguals whose productive and receptive language skills are in significant asymmetry. Examining the nature of Spanish RHBs' linguistic systems as adults allows us to form hypotheses as to how their language skills developed in childhood and to suggest how their abilities should be best characterized. Additionally, these results help identify the areas of their grammar most in need of support or instruction in language classrooms. In the rest of this chapter I describe the results of this study in a task-by-task manner, while gradually building a picture of the grammatical systems and skills of Spanish RHBs.

4.3 Global Comprehension Ability: Results of Contextualized Listening Comprehension Task

Research Question 1: How accurately are Spanish RHBs able to extract meaning and information from aurally presented, conversational Spanish?

Research question 1 is concerned with the global comprehension skills of Spanish RHBs, and how well they attend to meaning while listening to conversational Spanish presented in a naturalistic manner. In this section, I report the data collected from the contextualized listening comprehension task, previously described in section 3.6. The specific task used was the Contextualized Listening Assessment (CoLA), developed by ACTFL, which was designed to determine to what degree participants understand spoken Spanish at the low- to mid-intermediate level as established by ACTFL proficiency guidelines. The purpose of using this task was twofold: 1) to establish a minimum level of comprehension ability necessary to qualify as a receptive bilingual for the purposes of the study (Beaudrie, 2006), and 2) to determine how well qualifying Spanish RHB participants perform on a proficiency-based, criterion-referenced

listening comprehension assessment. Spanish RHBs are predicted to have a good understanding of spoken Spanish and to understand the majority of what they hear.

To test this prediction, participants listened to 35 brief conversations in Spanish which were contextualized with photos. Each was followed by a multiple-choice comprehension question in English. Participants earned one point for each question answered correctly and were not penalized for incorrect answers. Possible overall scores ranged from 0-35. The following two tables present Spanish RHB individual subject scores and descriptive statistics (mean, median, standard deviation) prior to determining participant eligibility.

Table 4-1: Raw Spanish RHB scores for contextualized listening comprehension task

Participant	Listening Score
1	29
2	12
3	13
4	16
5	28
6	9
7	19
8	28
9	21
10	19
11	19
12	24
13	18
14	26

15	22
16	32
17	21
18	16
19	24
20	29
21	29
22	30
23	25
24	22
25	--- ¹¹
26	26
27	20
28	29
29	27
30	32
31	32
32	29
33	34
34	27
35	24
36	13
37	33
38	15

¹¹ A score for the contextualized listening comprehension task was not recorded for this participant. This participant had been placed via a placement exam in the Spanish for heritage learners class and none of their scores on the remaining experimental tasks were outliers. The decision was therefore made to include this participant in the Spanish RHB group despite the missing score for the comprehension task, and their data is included in the analyses of the three remaining experimental tasks.

39	30
40	18

Table 4-2: Descriptive statistics for Spanish RHB results on contextualized comprehension task used to determined participant eligibility

Mean	23.59
Range	9-34
Standard deviation	6.55
Cut off	17

Based on these results, the established minimum qualifying score for the Spanish RHB group was 17, which was calculated by subtracting one standard deviation from the mean score for all participants (Beaudrie, 2006). The following table displays the descriptive statistics for the Spanish RHB group once data for the seven non-qualifying participants was eliminated. Results are also shown for the advanced bilingual comparison and monolingual control group.

Table 4-3: Descriptive statistics for contextualized comprehension task – eligible Spanish RHBs and comparison/control groups

Group	N	Mean	Average Accuracy	(SD)	Range
Spanish RHBs	32	25.81	73.74%	4.80	18-34
Spanish AHBs	39 ¹²	34.00	97.14%	1.11	30-35
Monolingually-raised speakers	10	34.10	97.43%	1.10	32-35

The information given in Table 4-3 above supports the prediction that Spanish RHBs are able to understand the majority of what they hear when listening to spoken Spanish presented in a naturalistic manner. To answer the research question about how complete this understanding is, the mean score for the RHB group was, $M=25.81$ out of a total possible score of 35. This

¹² Results were not recorded for two of the advanced heritage bilinguals

indicates that as a whole, Spanish RHBs are able to understand approximately 74% of what they hear when listening to Spanish. However, a comparison of the range and standard deviation of the Spanish RHB group with those of the other two comparison groups reveals that RHB performance is much more variable. While accuracy on the contextualized comprehension task in the AHB group varies between 85.71% and 100%, in the RHB group accuracy ranges from 51.43%¹³ to 97.14%. To better see this variability, frequency distributions for scores the Spanish RHB group on the contextualized listening comprehension task are displayed in both the table and figure that follow.

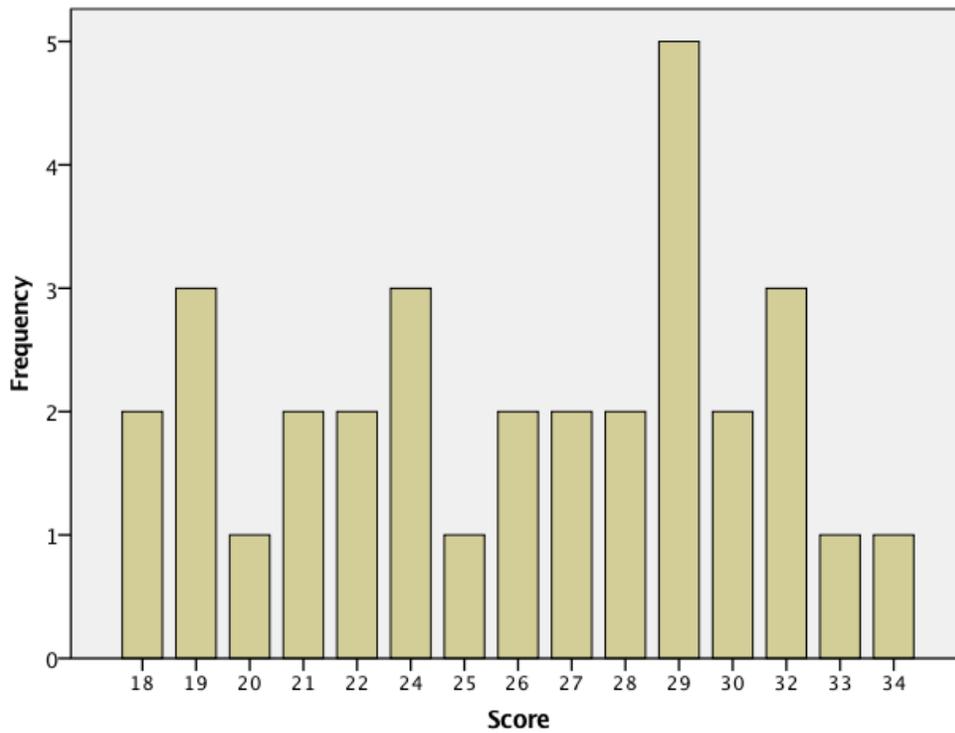
Table 4-4: Frequency distribution – scores for Spanish RHB group on contextualized comprehension task

Score	Frequency
17	---
18	2
19	3
20	1
21	2
22	2
23	---
24	3
25	1
26	2
27	2
28	2

¹³ It is important to note that 50% accuracy on the contextualized listening comprehension task does not mean that participants were performing at chance. For each dialog that participants heard, a corresponding comprehension question was displayed that had four different options. A participant performing at chance would therefore earn an overall score of 25%.

29	5
30	2
31	---
32	3
33	1
34	1
35	---
N	32

Figure 4-1: Frequency distribution – scores for Spanish RHB group on contextualized comprehension task

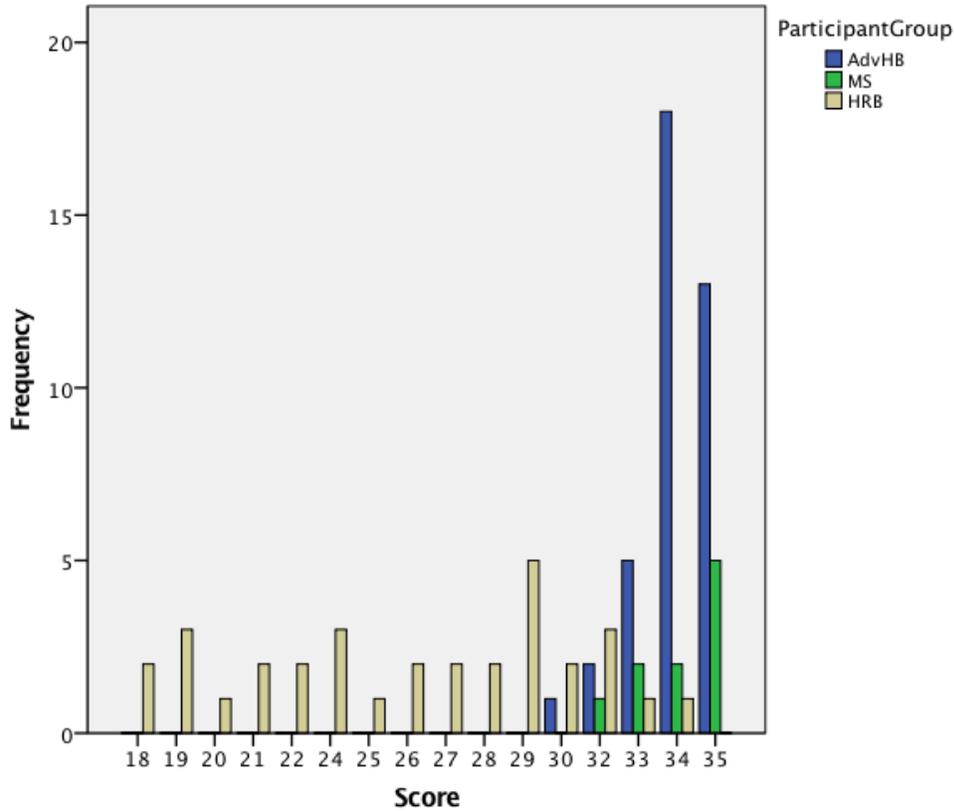


Although every effort was made to reduce the variability in the RHB group throughout the participant screening and selection process, variability is nevertheless a characteristic of

heritage bilinguals (Montrul, 2013). In fact, the descriptive statistics for the RHB group displayed previously in Table 4-3 very closely mimic the participant performance on the same contextualized listening comprehension task reported by Beaudrie in her 2006 study of similar receptive bilinguals ($M=26.9$, Range: 17-34, SD 4.8).

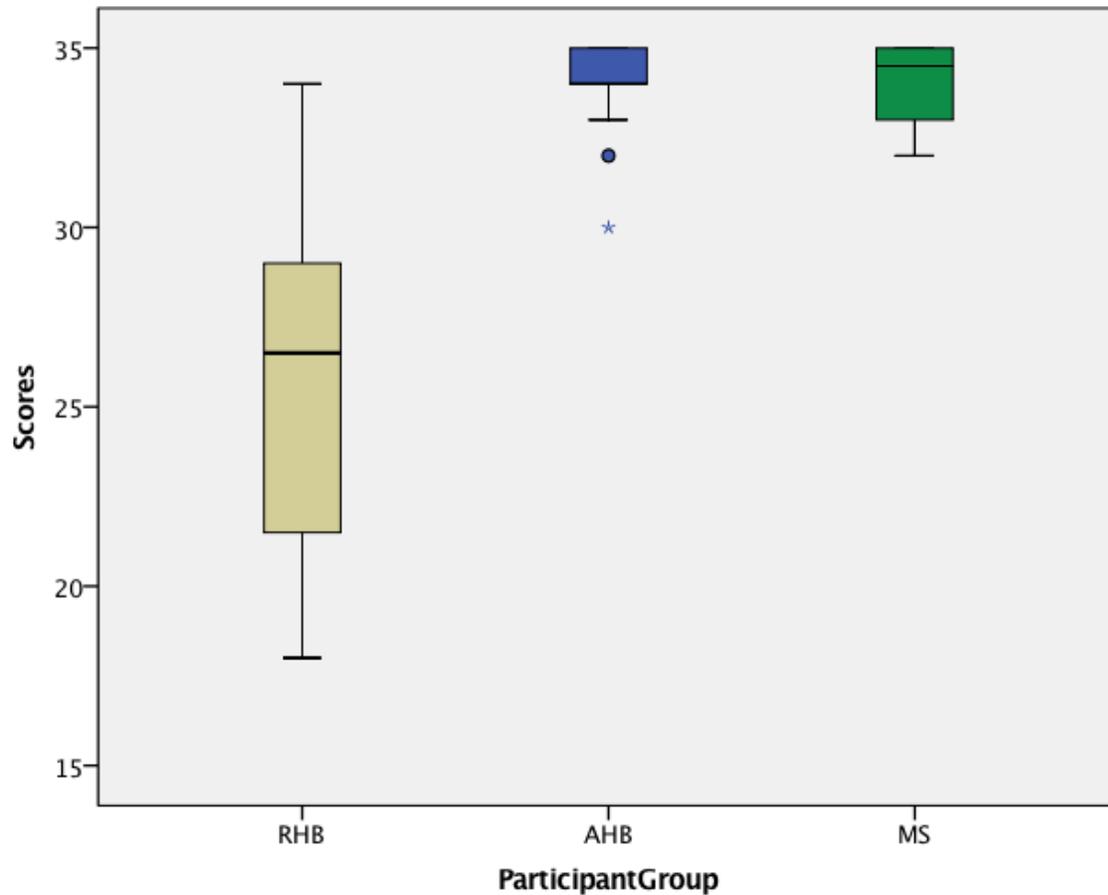
One limitation of this task is that it was originally created based on ACTFL standards meant to assess language skills acquired in an L2 setting. The validity of using such tools to assess the language skills of heritage bilinguals has been questioned in the literature (Kagan & Friedman, 2003; Lowe, 1998; Valdés, 1989), and it is possible that this task does not reflect the full listening comprehension abilities of Spanish RHBs as a result. RHBs may understand a larger percentage of what they hear at home and comprehension abilities in familiar contexts may not vary as much between participants. The following figure displays the distribution of scores by participant group on the contextualized listening comprehension task.

Figure 4-2: Frequency distribution of scores by participant group – contextualized listening comprehension task



Although some of the RHBs scored in the range of the AHB group, as a whole RHBs were less accurate than the AHB group. Results of a one-way ANOVA reveal a main effect of group $F(2,78) = 66.42, p < 0.001$ and a follow-up t-test showed that accuracy scores for the RHB group were significantly lower than those of the AHB group ($t(69) = -10.38, p < 0.001$). No significant differences between the AHB and MS group were found ($t(47) = -0.27, p = 0.394$). The following figure shows the distribution of the mean accuracy scores for the contextualized listening comprehension task.

Figure 4-3: Boxplot of distribution of scores for the contextualized comprehension task



4.3.1 Summary of findings for research question 1

The global comprehension task showed that on average Spanish HRBs understand the majority (approximately 77%) of the content they hear when listening to naturalistic speech in Spanish. Although their listening comprehension accuracy rates were lower than those of the advanced bilingual and monolingual groups, they were also quite variable and some participants scored in the same range as the advanced heritage bilinguals and monolinguals. It is important to note that this global comprehension assessment measure was designed to test the listening

comprehension of L2 learners and not heritage bilinguals or native speakers. Therefore, the results are not necessarily representative of the level of comprehension that participants might have in other contexts, such as listening to family members speak in familiar contexts.

4.4 Proficiency: Results of Elicited Imitation Task

Research Question 2: How do Spanish RHBs perform on an aural task measuring overall Spanish language proficiency?

Research question 2 is concerned with how to best measure the proficiency of Spanish RHBs in a way that is appropriate for their specific linguistic profile. In this study, proficiency is measured for two reasons: 1) the first is to obtain a measure of Spanish RHBs' overall language abilities in Spanish, and 2) the second is so that the relationship between grammatical competency and proficiency can be examined. While other studies of Spanish RHBs have inferred a low level of proficiency through descriptions of their language abilities and their performance on other tasks (Beaudrie, 2006, 2009a; Valdés, 1995, 2005, 2012), to date no study has tested the proficiency of Spanish RHBs directly. The average proficiency of Spanish RHBs is expected to fall on the lower side of the proficiency spectrum, however, variation in proficiency is also expected.

In order to test this prediction, the proficiency of Spanish RHBs was evaluated using an elicited imitation task (Bowden, 2016; Ortega, 2000; Ortega et al., 1999). Most generally, an elicited imitation task consists of a stimulus presented aurally to participants (normally a spoken sentence), who after hearing it are instructed to repeat it as accurately as possible. Importantly, elicited imitation tasks evaluate proficiency by tapping implicit knowledge of a language in a

manner that is neither literacy nor production dependent (Ellis, 2005; Tracy-Ventura et al., 2014; Zamora, 2015). This makes it a particularly appropriate instrument for evaluating the language skills of Spanish RHBs, whose literacy skills and production abilities are limited. The rationale behind utilizing elicited imitation to assess proficiency specifically is that the successful and accurate repetition of the stimulus is dependent on the participant having the sufficient language skills to hear, parse, and comprehend the message conveyed by what they hear (Tracy-Ventura et al., 2014). Successful repetition is gauged by the extent to which participants can reproduce both the sentence structure and the idea units contained within the sentence. When evaluating participants' repetitions, any missing idea units and/or significant deviations from sentence structure are interpreted as an indication of processing difficulty related to phonology, syntax, or the lexicon. These difficulties, or a lack thereof, are understood to be a direct reflection of one's overall proficiency in the language (Munnich et al., 1994; Tracy-Ventura et al., 2014; Zamora, 2015).

In the specific elicited imitation instrument used in this research (Bowden, 2007; Ortega, 2000; Ortega et al., 1999) participants heard and repeated a series of 30 grammatical sentences in Spanish. The task was designed to ensure that participants could not simply parrot the sentences back without parsing, decoding and forming a mental representation of what they had heard. This was accomplished in two ways: 1) sentence length was controlled so that sentences increased from 7 to 17 syllables as participants proceeded through task from beginning to end. 2) The task also forced participants to pause and wait for two seconds after hearing each sentence before repeating it. Participant responses were audio recorded and later scored, with each sentence repetition receiving a rating that could vary between 0-4 points. Individual proficiency scores

were calculated by summing the ratings given for each of the 30 sentences heard by participants, and could therefore range between 0 and 120. The rating criteria for this task, presented in Appendix E, provides a rubric for coding the repetitions in accordance with how accurately participants reproduced both the structure and meaning of each sentence.

I now turn to the results of the elicited imitation task. In the following two tables and figure, the overall proficiency score for each individual in the Spanish RHB group is given, as are descriptive statistics for the group as a whole and the distribution of their scores.

Table 4-5: Individual Spanish RHB scores for elicited imitation task

Participant¹⁴	Score
1	18
5	29
7	27
8	48
9	19
10	10
11	23
12	25
13	8
14	25
15	15
16	56
17	22
19	51

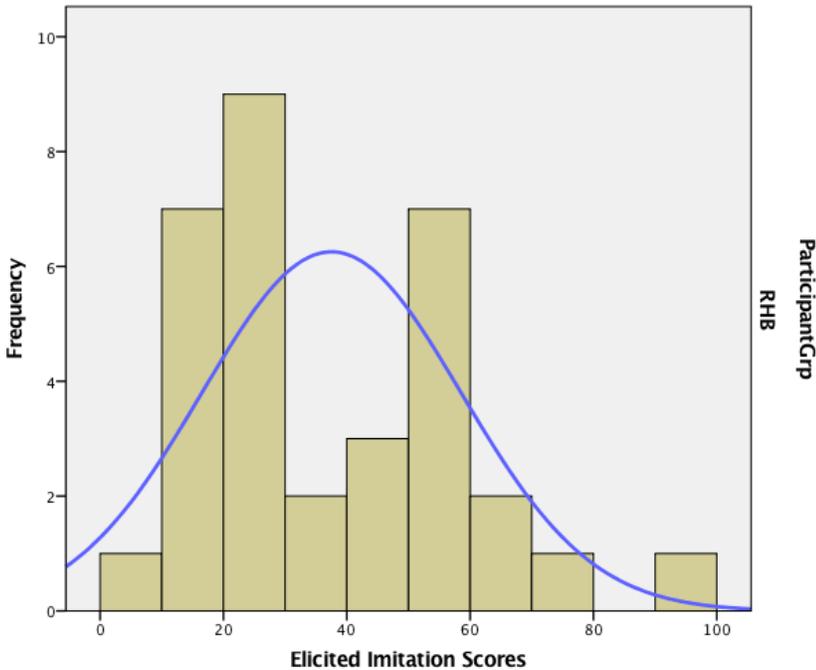
¹⁴ Participant numbers coincide with those listed in previously in Table 4-4 in Section 4.3, but do not appear consecutively here as data for non-qualifying participants has been removed.

20	44
21	63
22	67
23	26
24	17
25	17
26	50
27	22
28	57
29	39
30	24
31	96
32	36
33	59
34	58
35	53
37	70
39	49
40	15
N	33

Table 4-6: Descriptive statistics for Spanish RHB results on elicited imitation task

Mean	37.52
Median ¹⁵	29.00
Range	8-96
Standard deviation	21.05

Figure 4-4: Frequency distribution – scores for Spanish RHB group on elicited imitation task

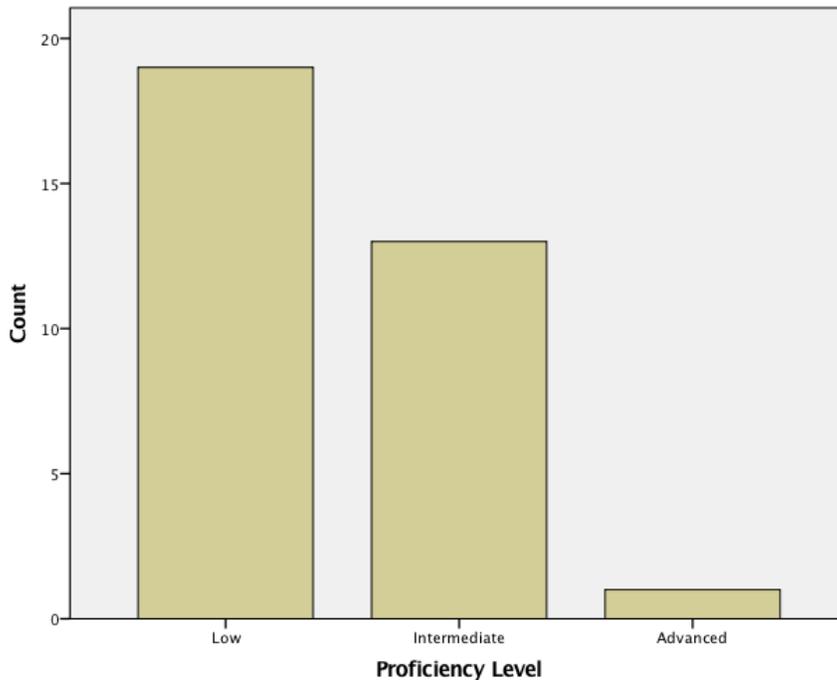


Previous studies using this specific instrument have not assigned participants to a certain proficiency level per se; for example, beginning, intermediate, or advanced proficiency. For the purposes of this research and to determine how the skills of any given group of Spanish RHBs might vary by proficiency, those individuals with overall scores between a 0-40 (the bottom third percent of the range of potential scores) were considered to have “low” proficiency. Those scoring between 41-80 (middle third percent of the potential score range) were considered to

¹⁵ Reported due to the skewed distribution of scores on this task

have “intermediate” proficiency, and those scoring between 81-120 (upper third percent of the potential score range) were considered to have “advanced” proficiency. The following figure displays Spanish RHB scores on the elicited imitation task grouped by low (57.60%, $n=19$), intermediate (39.40%, $n=13$), and advanced proficiency (3.0%, $n=1$).

Figure 4-5: Spanish RHB elicited imitation scores by proficiency level



Returning to research question 2, the data from the elicited imitation task supports the prediction that the proficiency of Spanish RHBs is variable, but does primarily fall on the lower end of the proficiency continuum. As reported in Table 4-6 above, the mean and median scores for Spanish RHBs are $M=37.52$ and $Mdn=29.00$ respectively, both of which fall in the “low” proficiency category as established for this study. However, there is quite a bit of variation in individual proficiency scores. It is worth noting that similar variation was found for lower

proficiency participants in two previous studies; one which used the same elicited imitation task as in this research (Zamora, 2015), and one which used a similar version in French (Tracy-Ventura et al., 2014). However, despite the fact that the majority of Spanish RHBs fall in the “low” proficiency category, the median score of 29 indicates that half of the Spanish RHB participants scored in the upper quartile of what is considered “low” proficiency, or higher. Recall that the scores of 39.40% of participants were categorized as “intermediate” and 3.0% (1 individual) as “advanced”¹⁶. The following table and figure display descriptive statistics and a boxplot of scores on the elicited imitation task for the RHB group alongside the AHB comparison and MS control group.

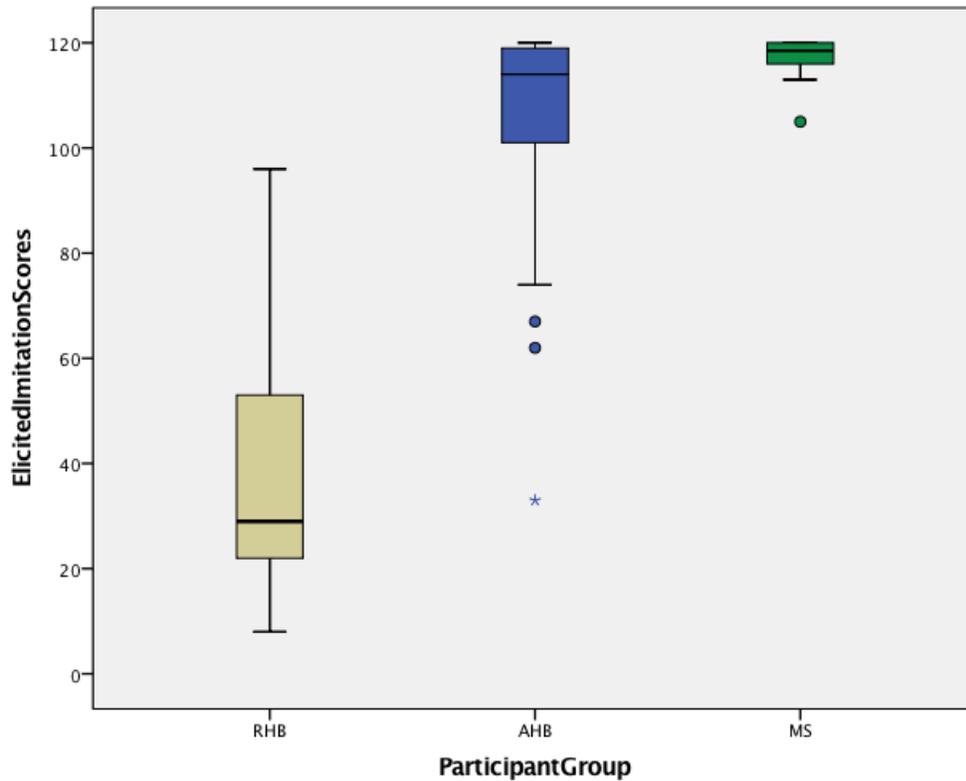
Table 4-7: Descriptive data for elicited imitation task

Group	N	Mean	(SD)	Range
Spanish RHBs	33	37.52	21.05	8-96
AHBs	39 ¹⁷	105.67	19.78	33-120
MS control group	10	116.80	4.73	105-120

¹⁶ As discussed in Chapter 3, despite the high score on the elicited imitation task, this participant was identified as a Spanish RHB via a selective participant recruiting process as well as by reviewing their performance on the contextualized listening comprehension task and oral production task. All of these measures indicated that this participant was in fact a Spanish RHB.

¹⁷ Results were not recorded for two of the advanced heritage bilinguals

Figure 4-6: Boxplot of distribution of scores for the elicited imitation task

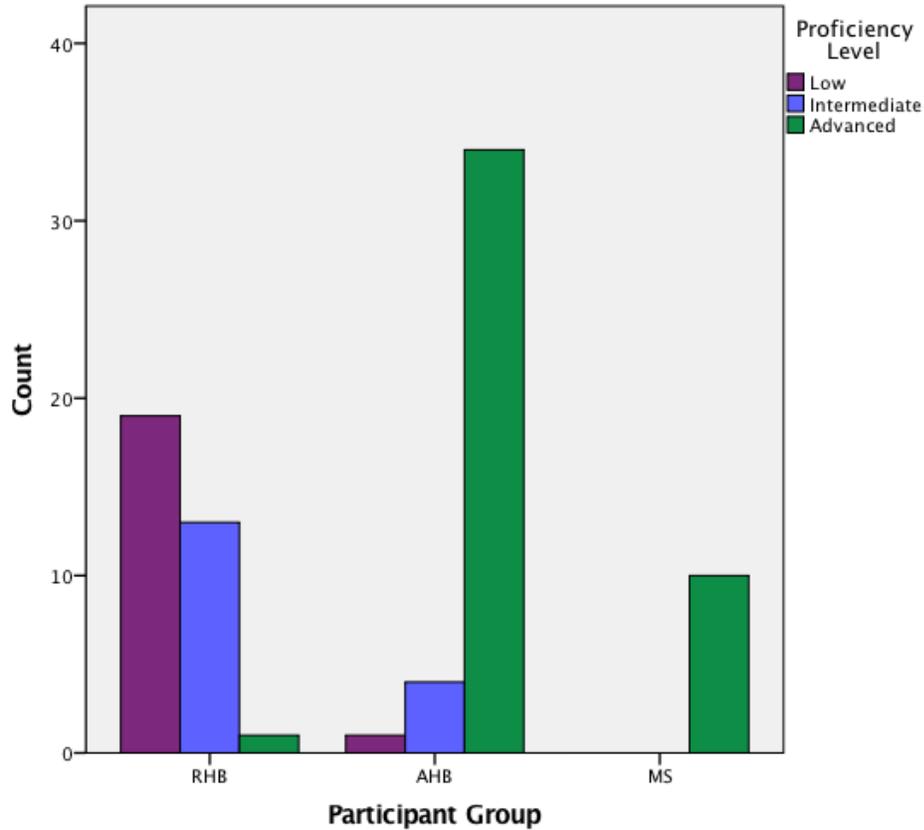


Results of a one-way ANOVA revealed a main effect of group $F(2,79) = 133.46, p < 0.0001$. Follow up t-tests show significant differences in elicited imitation scores between all three groups: the AHB group outperformed the Spanish RHB group $t(70) = -14.15, p < 0.0001$, and the monolingual control group outperformed the AHB group $t(47) = -1.76, p = 0.010$. The distribution of scores by proficiency level for all three participant groups is displayed in the table and figure below.

Table 4-8: Proficiency level by subject group – elicited imitation task

Group	Low	Intermediate	Advanced
Spanish HRBs	57.60% (n=19)	39.40% (n=13)	3.0% (n=1)
Spanish AHBs	2.5% (n=1)	10.3% (n=4)	87.2% (n=34)
Monolingual speakers	---	---	100% (n=10)

Figure 4-7: Proficiency level group by subject group – elicited imitation task



4.4.1 Summary of findings for research question 2

Research question 2 is concerned with how Spanish RHBs perform on a task designed to measure language proficiency that does not rely on participants' ability to speak, read, or write in Spanish. Spanish RHBs were predicted to score on the lower end of the proficiency scale, although variation was also predicted.

The results of this task support these predictions, with scores for the majority of RHBs (57.60%, $n=19$) falling in the "low" proficiency range. An additional 39.40% ($n=13$) scored in the "intermediate range" and one individual (3%) scored in the advanced range. However, the median score for the Spanish RHB group was 29, meaning half of the participants scored in the upper quartile of the "low" proficiency tier or higher, and there was overlap in scores between the RHB and AHB groups. As mentioned previously, similar variability has been found in other studies, including Zamora's 2015 study that used the same elicited imitation instrument.

4.5 Grammatical Competence: Results of Self-paced, Aural Grammaticality Judgment Task

Research Question 3: Are Spanish RHBs sensitive to morphosyntactic well-formedness in spoken Spanish, and to what degree?

- a. How does sensitivity to grammaticality vary between morpheme conditions?
- b. What might account for variation between morpheme conditions?

So far in this chapter I have presented the results of tasks designed to measure the global language abilities of RHBs in Spanish. These included a contextualized listening comprehension task and an elicited imitation task that measured overall proficiency. In section 4.3, I explained that Spanish RHBs, both individually and on average, understand the majority of what they hear

when listening to spoken, conversational Spanish. In section 4.4, I showed that RHBs have low to intermediate proficiency in Spanish. RHBs show evidence of these abilities in Spanish despite their limited literacy skills and production abilities.

Research question 3 is concerned with the nature of the underlying grammatical system that supports the ability of RHBs to understand spoken Spanish. Currently, little is known about the sorts of implicit knowledge that RHBs have about the rules that govern the structure of Spanish, or whether that knowledge includes intuitions about grammaticality. Research question 3 specifically asks whether Spanish RHBs have access to the rules governing morphological structure, which is an area of grammar that is vulnerable in heritage and bilingual language acquisition (see discussion in chapter 2).

To test this question, an aural, grammaticality judgment task (Sherkina-Lieber, 2011) was used. In this task, participants listened to a series of minimal sentence pairs that differed only by a target morpheme. Target morphemes were grammatical 50% of the time, and ungrammatical 50% of the time. Participants progressed through the sentences at a participant-controlled, phrase-by-phrase rate, and indicated at the end of each one whether it sounded “right” to them. Accuracy rates and listening times were recorded. The rationale behind this task is that if a given morpheme class does not form part of a bilingual’s underlying grammatical system, then participants would be unable to intuitively distinguish between target grammatical and ungrammatical morphemes in minimal sentence pairs (Gass, 1994; Leow, 1996; Munnich, et al., 1994; Sherkina-Lieber, 2011). In this case, participants would be expected to either accept all sentences as sounding “right”, or to perform at chance due to their inability to distinguish between them. On the other hand, if Spanish RHBs do have underlying knowledge of the rules

that govern morphological well-formedness, then participants would be expected to reliably distinguish between the minimal sentence pairs.

Similarly, if Spanish RHBs do not attend to morphological well-formedness, listening times between phrases containing the grammatical/ungrammatical morpheme pairs should not differ. However, if morphology does form part of Spanish RHBs' underlying grammatical systems, then listening times should be longer for ungrammatical target items. Longer listening times for items that violate well-formedness rules are understood to be caused by the processing difficulties that arise as a result of attempting to parse them (Pearlmutter, Garnsey & Bock, 1999). The inclusion of listening times in the data provides a way of measuring participants' reaction to the stimuli online or in "real time," which may provide a more sensitive indication of whether participants notice the grammaticality of the stimuli than do the follow up question about whether the sentences sound "right" or not. Although test items were controlled carefully for dialect and lexical frequency, answers to the follow-up question could potentially be influenced by a multitude of factors that participants notice in the stimuli, which could be unrelated to morphology. Summarizing the above, the aural self-paced GJT provides a measure of grammatical competence, measured by accuracy rates and listening times, from which extrapolations can be made about the nature of the underlying grammatical system of Spanish RHBs.

The five morphological conditions tested by the GJT were chosen from a list of grammatical structures typically taught in a first-semester Spanish for receptive heritage bilinguals class (Beaudrie, 2006). These include gender and subject/verb agreement morphology, as well as tense and aspect morphology. Mood morphology was also tested. As discussed in

Chapter 2, these morpheme classes are not acquired simultaneously in childhood. Rather, certain grammatical structures emerge and begin to stabilize around the age of 2-3, while others do not stabilize until the age of 7+. Spanish RHBs are predicted to be the most sensitive to the grammaticality of morphological structures that emerge and stabilize earliest in childhood, as they would have had the most Spanish input during the period these forms were being acquired. Their knowledge of forms whose acquisition stabilizes later is expected to be less robust, as all RHB participants experienced a shift to English dominance upon beginning formal schooling at approximately the age of 5. The trend predicted for results of this task is that RHBs will be most sensitive to the grammaticality of gender agreement and subject/verb agreement, both of which emerge around the age of 2 and stabilize at approximately 3 years of age. Sensitivity to the grammaticality of present/preterit morphology is predicted to follow as it stabilizes around the age of 4 years. Spanish RHBs are predicted to be the least sensitive to the grammaticality of aspect and mood morphology. Aspect stabilizes around the age of 7 years, and mood has been shown to stabilize sometime between the ages of 7 and adolescence.

The rest of this section is dedicated to describing the results of the aural, self-paced, GJT. Overall accuracy rates are presented first followed by accuracy rates by morphological condition. Then results of the listening time data are discussed. In order to keep the length of this chapter reasonable, only the results for the Spanish RHB group are discussed in detail. Although results for the AHB and MS group have been included, specifics are only discussed when they reveal something important about the data or stimuli overall. Also, recall that the MS group was included to test the validity of the instruments themselves, not to serve as benchmark by which the results of heritage bilinguals should be compared.

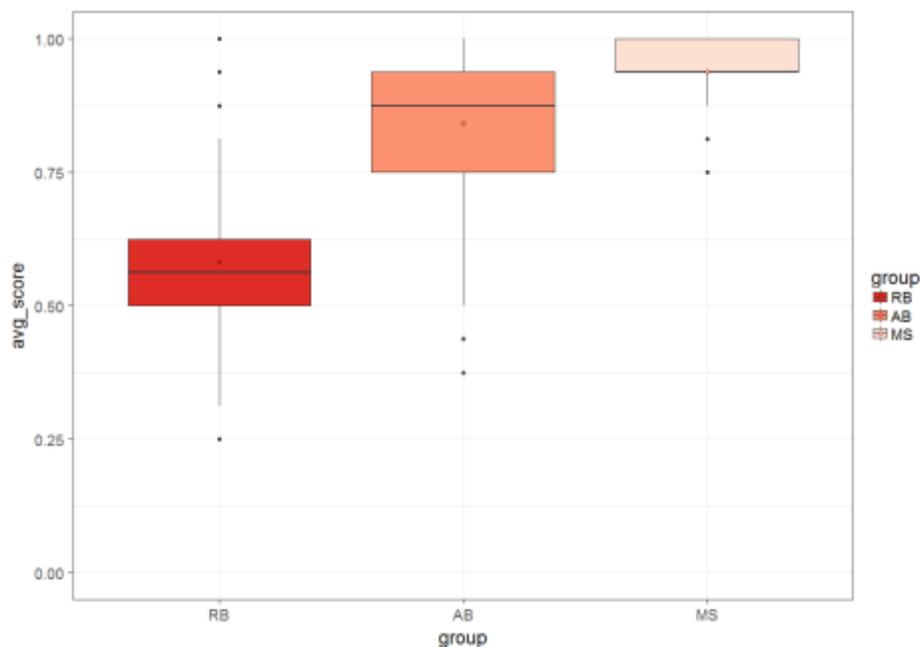
4.5.1 Overall accuracy

In this section I report the accuracy with which Spanish RHBs were able to distinguish between grammatical and ungrammatical morphemes in the five morpheme conditions. Mean accuracy rates, calculated as the percentage of the test items for which participants correctly indicated “yes” for a grammatical item or “no” for an ungrammatical item, are shown in the following table and figure.

Table 4-9: Overall average accuracy for aural self-paced grammaticality judgment task.

Participant Group	Mean	Standard Deviation
Spanish RHBs	0.58	0.49
Spanish AHBs	0.84	0.36
MS	0.95	0.24

Figure 4-8: Overall average accuracy on aural, self-paced GJT



Returning to question 3, which asks to what degree Spanish RHBs are sensitive to morphosyntactic well-formedness in spoken Spanish, the results show that on average, Spanish RHBs were able to correctly determine the grammaticality of the test items 58% of the time. Since participant responses were binary yes/no answers, chance performance on this task is 50%. RHBs performed above chance across all morphological conditions. Similar to the results of the first two tasks described in this chapter, there is considerable variation in the Spanish RHB group. However as also previously mentioned, variability is a feature of this population.

In order to determine how the RHB group performed in comparison to the AHB group, a linear mixed effects model was run with subject group as the fixed effect and mean accuracy rate as the random effect. Accuracy rates for the Spanish RHB group were significantly lower than those of the AHB group ($t(87) = 48.51, p < .001$). With the RHB group established as the reference level, the statistical analyses showed that RHBs were approximately 26% less accurate than the AHB group. These results are summarized in the table below.

Table 4-10: Results of mixed effects model for mean accuracy by participant group on the aural, self-paced GJT (Spanish RHB group set as reference level)

Fixed Effects	Estimate	SE	df	t-value	p-value
Intercept	0.58	0.01	87	48.51	< .001
AHB	0.26	0.02	87	15.27	< .001
MS	0.36	0.03	87	12.61	< .001

While the results thus far support the prediction that Spanish RBHs do have underlying knowledge of morphological well-formedness, research question 3a is also concerned with whether sensitivity to well-formedness varies between morphological conditions and what might

explain this variation. In the following section, accuracy rates are reported and discussed by morphological condition.

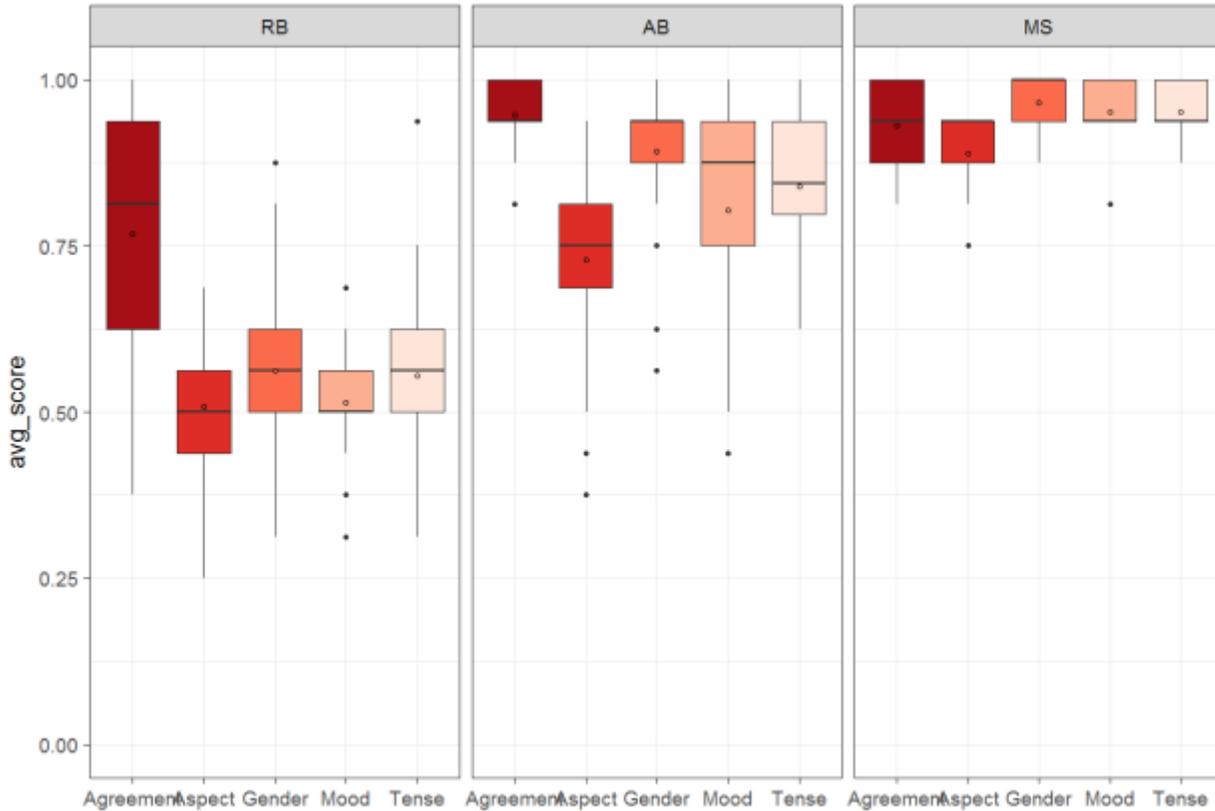
4.5.2 Accuracy by morphological condition

So far, accuracy rates averaged across the morphological conditions have shown that Spanish RHBs do perform above chance when determining the well-formedness of grammatical versus ungrammatical morphemes. I now turn my attention to how the RHBs performed on this task in each morphological condition. Average accuracy in each of the five different morphological conditions is shown in the table and figure below.

Table 4-11: Average accuracy by morphological condition on self-paced, aural GJT

Participant Group	Gender	Agreement	Tense	Aspect	Mood
Spanish RHBs (SD)	0.56 (0.50)	0.77 (0.42)	0.55 (0.50)	0.51 (0.50)	0.51 (0.50)
Spanish AHBs (SD)	0.89 (0.31)	0.95 (0.22)	0.84 (0.37)	0.73 (0.45)	0.80 (0.40)
MS (SD)	0.97 (0.18)	0.93 (0.26)	0.95 (0.22)	0.89 (0.32)	0.95 (0.22)

Figure 4-9: Average accuracy by morphological condition on aural, self-paced, GJT



Spanish RHBs were most accurate in the subject/verb agreement condition ($M=77\%$) followed by the gender ($M=56\%$), tense ($M=55\%$), mood ($M=51\%$) and aspect ($M=51\%$) conditions. This trend in the data supports the prediction that participants would have most robust knowledge of those structures acquired earlier in childhood, and that their knowledge would taper off for structures that stabilize later.

To determine whether differences in accuracy between morphological conditions were significant for the RHB group, pairwise comparisons were examined using Tukey contrasts and correcting for family-wise error. The results are summarized in the table below.

Table 4-12: Pairwise comparisons – Spanish RHB accuracy by morphological conditions on the self-paced, aural GJT

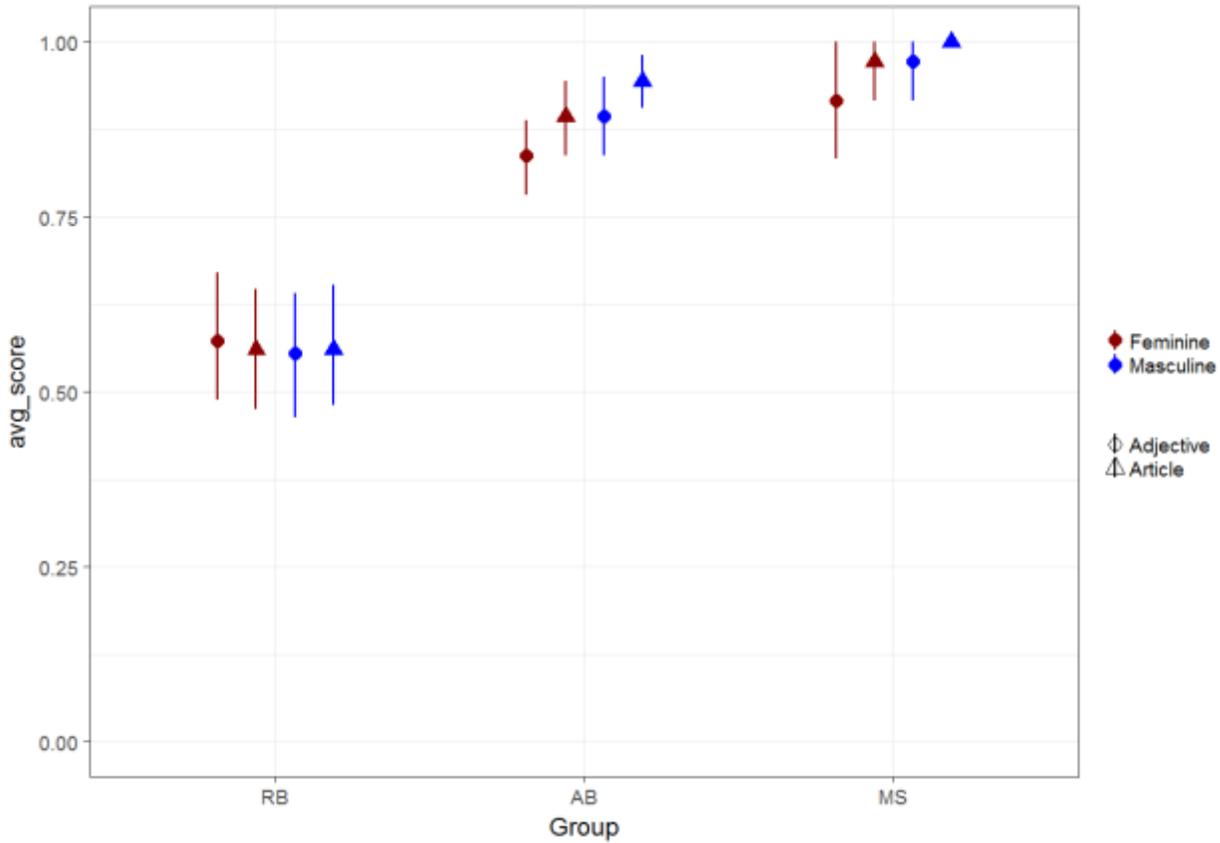
(significant differences indicated with asterisk):

Comparison of conditions	Estimate	SE	z-value	p-value
Asp – Agr	-0.26	0.02	-10.61	< 0.001*
Gen – Agr	-0.21	0.02	-8.38	< 0.001*
Moo – Agr	-0.25	0.02	-10.36	< 0.001*
Ten – Agr	-0.21	0.02	-8.69	< 0.001*
Gen – Asp	0.05	0.02	2.23	0.167
Moo – Asp	0.01	0.02	0.25	0.999
Ten – Asp	0.05	0.02	1.92	0.305
Moo – Gen	-0.05	0.02	-1.99	0.273
Ten – Gen	-0.01	0.02	-0.31	0.998
Ten – Moo	0.04	0.02	1.68	0.449

The results show that while Spanish RHB accuracy did vary by morphological condition as predicted, not all differences in performance between morpheme classes were statistically significant. Accuracy in the subject/verb agreement condition was significantly higher than any of the other four morphological conditions. While sensitivity does decrease for each of the other four morphological conditions as predicted, this decreasing sensitivity is not statistically significant for the RHB group. The direction of the results between the morpheme conditions supports the prediction that accuracy would vary as a function of morpheme class, and more specifically by the relative lateness by which specific morphemes are acquired in childhood. However, the lack of a significant difference between performance on gender morphemes, which are acquired relatively early, and late-acquired morphemes such as aspect and mood, is surprising.

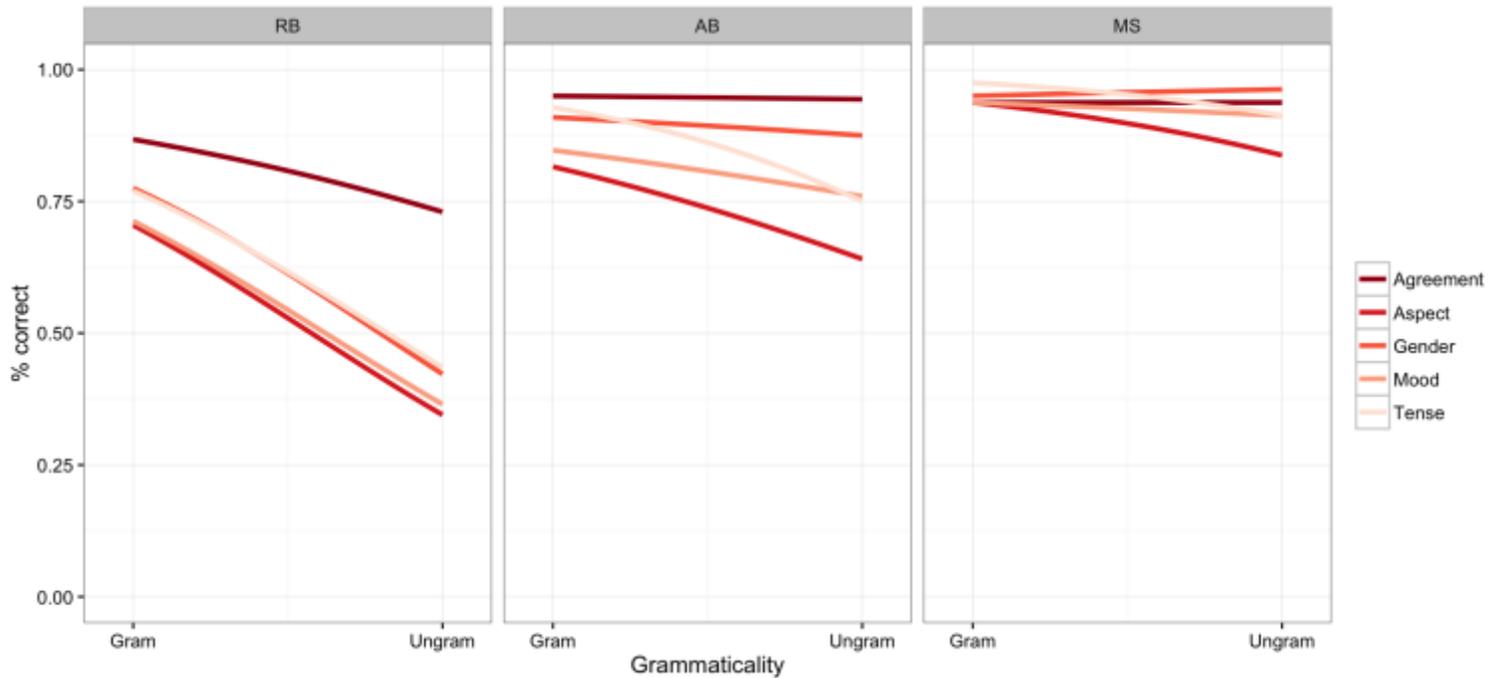
This brings me to research question 3b, which is related to possible explanations for significant differences (or lack thereof) in performance between the different morphological conditions. One surprising result was the lack of a significant difference in accuracy between the gender and tense/aspect/mood conditions. The fact that accuracy in the gender condition was not significantly higher than that of the tense, aspect or mood conditions is surprising because gender morphology emerges and stabilizes around the same time as subject/verb agreement morphology. Recall that RHBs were significantly more accurate in the subject/verb agreement condition than in any other condition. One possible explanation for this result is that despite subject/verb and gender morphology emerging at the same time, the semantic information provided by gender morphemes is more redundant than the information provided by subject/verb agreement morphemes (Atchey, 2015). This redundancy might result in Spanish RHBs attending more carefully to subject/verb agreement morphology. Indeed, difficulties in gender morpheme processing and production have been found to persist well beyond childhood and into adulthood (Montrul et al., 2008, 2014). As is shown in the figure below, RHBs performed nearly identically (and only just above chance) for all items in the gender agreement condition.

Figure 4-10: Average accuracy in the gender condition on aural, self-paced GJT



Another possible explanation is that RHBs focused on elements other than grammatical well-formedness when deciding whether test items sounded right or not. Although test items were controlled for dialect and word frequency to minimize the risk of confounding factors in the stimuli, it is still possible that RHBs based their answers to the follow up question on factors unrelated to grammaticality. When accuracy is examined as a function of grammaticality, a pattern arises that may provide evidence for this possibility. The following figure compares the accuracy with which participants determined the well-formedness of test items when they were grammatical, versus when they were ungrammatical.

Figure 4-11: Average accuracy by grammaticality and morphological condition - aural, self-paced GJT



Spanish RHBs were less accurate for ungrammatical items than they were grammatical items. Even if RHBs did subconsciously notice that the ungrammatical items sounded “off”, they may have focused on other aspects of the stimuli when answering the follow up question, which would could have potentially obscured their sensitivity to grammatical well-formedness.

If Spanish RHBs subconsciously noted morphological errors, but focused on other elements when responding to whether sentences in the GJT sounded right to them, it possible that this would be reflected by longer listening times for grammatical versus ungrammatical test items. A summary of the listening time results is given in the following section.

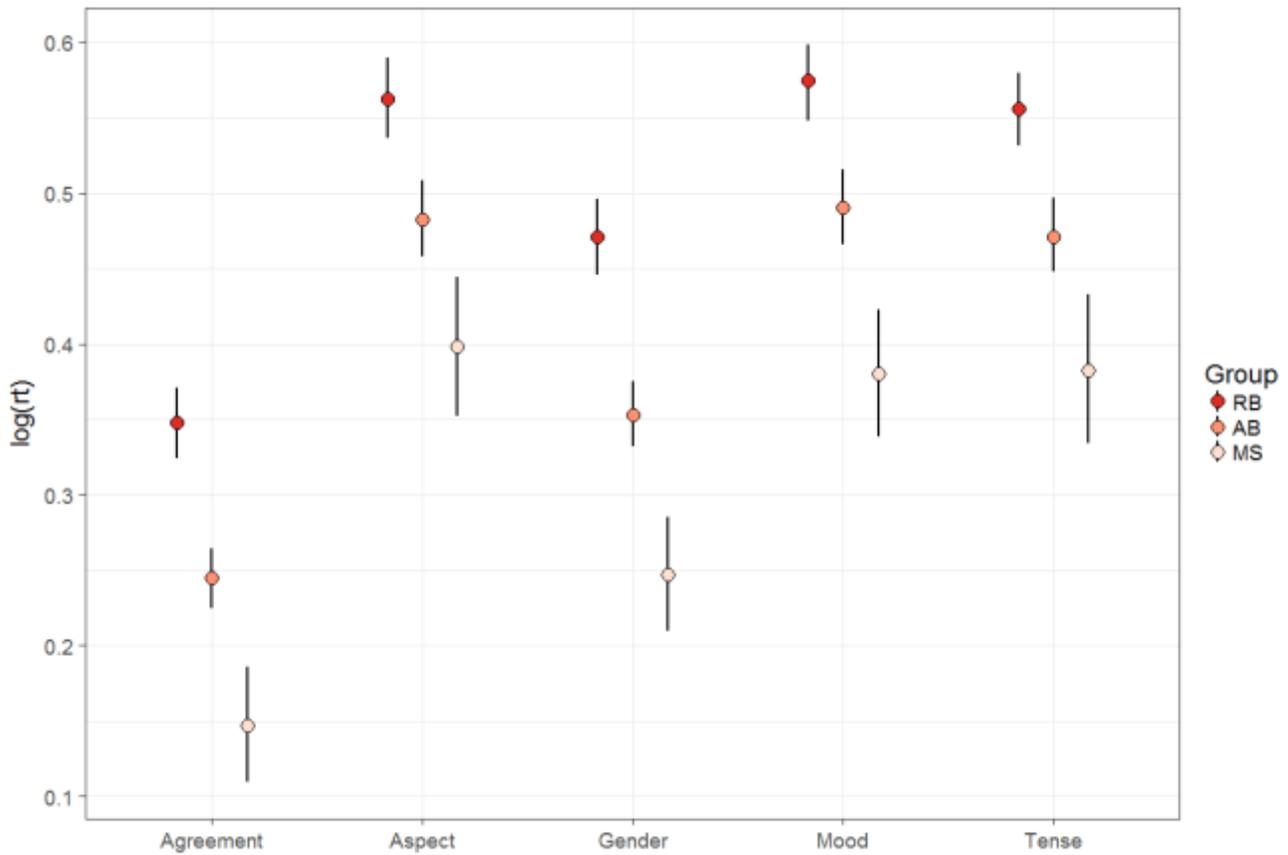
4.5.3 Listening time data

So far, results of the aural, self-paced GJT have shown that knowledge of morphological well-formedness does form part of the underlying grammatical systems of Spanish RHBs. As predicted, sensitivity to the grammaticality of morphemes varies by morphological condition. While not all the differences between morphological conditions are statistically significant, the results of the accuracy data show that RHBs are most sensitive to the grammaticality of morphological structures acquired earliest in childhood, and are least sensitive to the grammaticality of those acquired latest. One potential explanation for the lack of significant accuracy between some morpheme classes that would otherwise be expected due to the considerable difference in the ages they emerge and stabilize in childhood, is that participants were focused on aspects of the stimuli other than grammaticality answering whether test items sounded right to them. In this section the results of the listening time data will be reviewed to see if there is any evidence that participants noticed the errors in the ungrammatical items, even if their responses on the follow up questions did not indicate so.

Recall that all test items for the self-paced, aural GJT were segmented into three phrases at major syntactic boundaries. This made it possible to isolate target morphemes in a single phrase so that listening times for the grammatical/ungrammatical target morphemes could be directly compared. Listening times were recorded from the onset of each of the three consecutive sound files that made up every test item, to the moment when participants moved on to the subsequent phrases or the follow up question. The onset of listening times was marked when participants pressed a key to initiate the sound file. The end of the listening time for each phrase was marked when the participant again pressed a key, either to progress to the next phrase of the

sentence or the follow up question. Average listening times by morphological condition are displayed in the following figure¹⁸.

Figure 4-12: Average listening times by morphological condition – aural, self-paced GJT

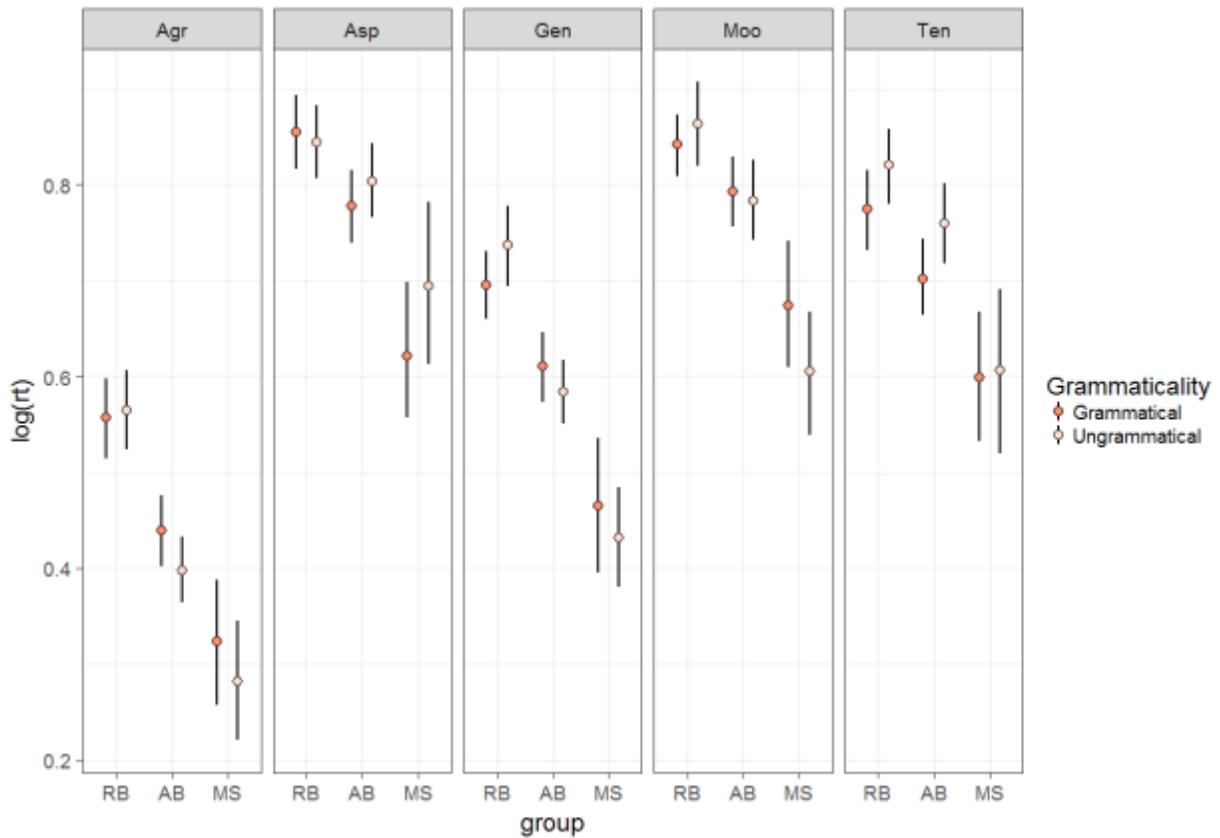


The results of a linear mixed model revealed a main effect of participant group ($X^2(2) = 11.22, p < .05$), and listening times for the Spanish RHB group were significantly longer than the other two groups for each of the morphological conditions. Listening times for the Spanish RHB

¹⁸ Listening times have been log transformed.

group were fastest for the subject/verb agreement condition, followed by the gender, tense, mood, and aspect conditions. Although differences in reaction times between the morpheme conditions are not directly comparable due to slight variations in the length of the target phrases between the different morphological conditions, the trend in these results nevertheless suggests that listening times were fastest and accuracy highest for early-acquired morphemes. Conversely, accuracy was lowest and listening times the longest for morphemes acquired latest. In the following table, average reaction times are plotted by morpheme condition and grammaticality.

Figure 4-13: Average listening times by morphological condition and grammaticality – aural, self-paced GJT

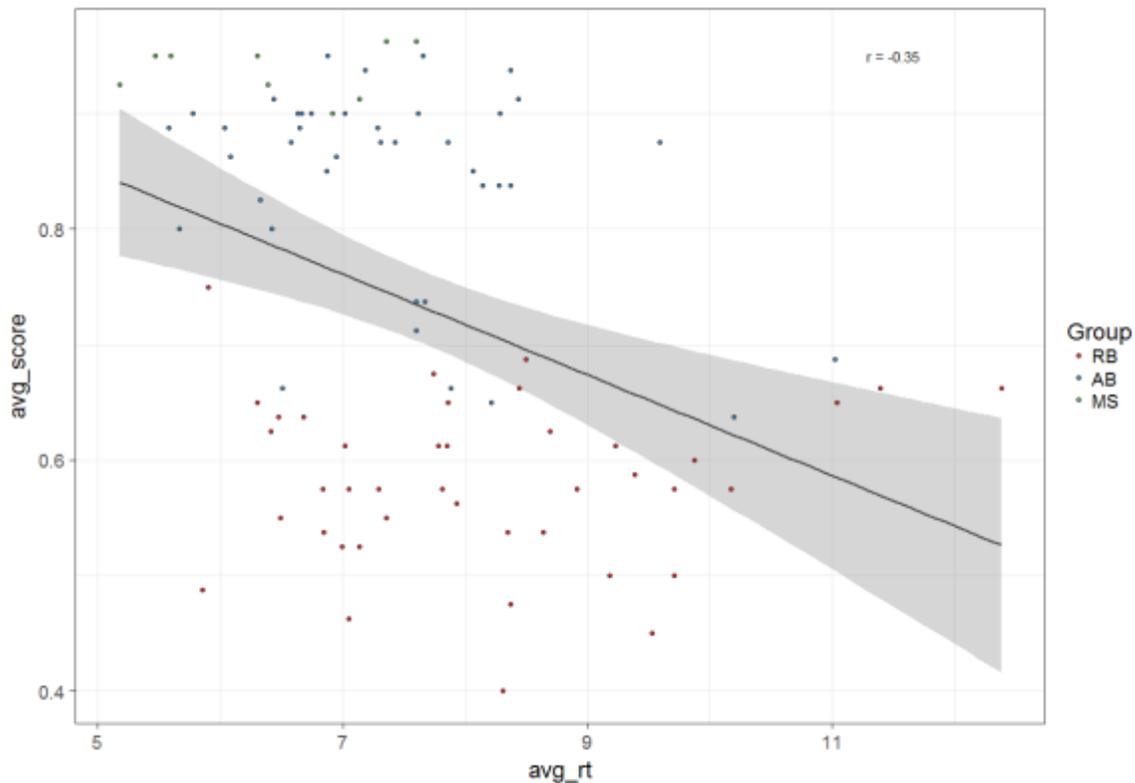


As shown by the figure above, RHB reaction times were slower for ungrammatical items in four out of the five morphological conditions: agreement, gender, mood and tense. This suggests that their processing load was higher for ungrammatical items, thereby causing lags in the listening times in comparison to the grammatical items. In the aspect condition, listening times were slightly faster for ungrammatical items. Recall that average accuracy in the aspect condition was just above chance (51%). When accuracy and listening time for the aspect condition are considered together, the data does not support that RHBs have underlying knowledge of well-formedness in the aspect condition. However, accuracy rates for all the participant groups were lowest in the aspect condition, and listening times were highest, suggesting that determining whether items in this condition were grammatical was particularly difficult for all participants. One possible explanation is that since the length of the test items was kept as short as possible, there was simply not enough contextual information given in the sentences in the aspect condition to easily disambiguate whether or not there was a perfective/imperfective mismatch or not. As a result, in relation to the Spanish RHB, this data does not necessarily conclusively rule out the possibility that aspect forms part of their underlying grammar.

The relationship between accuracy and listening time overall was tested using an independent samples t-test to examine whether there was a correlation between accuracy scores on the experimental items and listening times for the target morphemes. The t-test showed that a one-second increase in listening time correlates with a decrease in accuracy of approximately 4% ($t(98) = -3.7, p < .0001$). One possible interpretation of these findings is that for items for which participants were unsure, uncertainty regarding the grammaticality slowed reaction times, and

this uncertainty was also reflected by lower accuracy rates. The correlation between reaction times and accuracy scores is shown in the figure below.

Figure 4-14: Correlation between listening times and accuracy rates – aural, self-paced GJT



4.5.4 Summary of findings for research question 3

Put most simply, research question 3 asked whether Spanish RHBs hear errors in morphology and for which morpheme classes errors are most salient. The ability of RHBs to determine if target morphemes are grammatical or not is interpreted as a reflection of whether the rules governing their grammaticality form part of their underlying grammatical competence of Spanish RHBs. Both accuracy data and listening times indicate that RHBs did acquire knowledge of morphological structure in childhood, although the robustness of that knowledge

varies. RHBs were predicted to be the most accurate in the subject/verb agreement and gender conditions, followed by the tense condition, and then the aspect and mood conditions. While accuracy differences between morpheme classes were not all statistically significant, the results did follow this general trend. RHBs were statistically most accurate for the subject/verb agreement condition. Accuracy in the gender condition trailed that of the subject/verb agreement condition significantly, despite the fact that these two morpheme classes have similar acquisition trajectories in childhood. One proposed explanation for this is that gender morphology is semantically redundant in comparison to subject/verb morphology, resulting in less sensitivity to ungrammatical gender morphemes. RHBs were least accurate in the tense, mood and aspect conditions. Performance in the mood and aspect condition was only slightly above chance.

Listening time data revealed longer listening times for ungrammatical items in all the morphological conditions except for aspect. This suggests that participants may have subconsciously been aware of the grammatical distinctions in the tense and mood conditions, but that this awareness was not captured in the accuracy data from the follow up questions. Because neither accuracy nor listening time data indicated that RHBs could determine the grammaticality of aspect morphemes, it is possible that RHBs did not acquire underlying knowledge of aspect morphology in childhood. However, it is also possible that due to the nature of the task and items in the aspect condition, this task was not capable of detecting knowledge that RHBs might actually have. Ways in which this might be addressed in future studies are discussed in Chapter 5.

4.6 Semantic Knowledge: Results of Morpheme Comprehension Task

Research Question 4: Do Spanish RHBs process bound morphemes in order to interpret meaning?

- a. If so, are all morphemes processed equally?
- b. If not, what are the differences between morphemes and what may account for these differences?

In the previous section, the results of an aural, self-paced GJT suggest that RHBs do have underlying knowledge of the rules that govern morphological well-formedness in Spanish. This was shown by their ability to reliably distinguish between grammatical and ungrammatical morphemes in most of the morphological conditions tested. What the self-paced aural GJT does not measure, however, is the degree to which Spanish RHBs are able to process the semantic contribution of bound morphemes. Put another way, Spanish RHBs are able to decide when an utterance sounds right to them as a function of its grammaticality, but can they also process morphemes in those same conditions for meaning?

Recall that Spanish RHBs self-report having good general comprehension abilities. These reports are supported by the results of the contextualized listening comprehension task described in Section 4.3. However, these results also suggest that RHBs do not necessarily understand everything that they hear. Previous studies of heritage bilinguals have indicated that morphology can cause difficulties in production and comprehension, suggesting that not all morphemes may be processed equally for meaning.

In order to answer research question 4, an aural morpheme interpretation task (Sherkina-Lieber, 2011) was used. This task consisted of a series of pre-recorded mini “stories” (one to two

sentences) in Spanish presented to participants aurally, which were immediately followed by multiple-choice comprehension questions in English script related to the content participants heard. Crucially, the correct response to the comprehension question is dependent on participants processing a target morpheme in the stimuli. If the morpheme is not processed, the sentence will be ambiguous and participants will not be able to answer the follow up question accurately. Participants heard sentences containing morphemes pertaining to the same five morphological classes as were tested in the self-paced aural grammaticality task (grammatical gender, subject/verb agreement, tense, aspect and mood). A complete list of these stories can be found in Appendix H.

In contrast to the aural, self-paced GJT, which tested sensitivity to morphological well-formedness, the morpheme comprehension task tests whether Spanish RHBs can interpret the meaning supplied by bound morphemes when listening to spoken Spanish. The mini stories were therefore designed as minimal pairs that differed only by the target morpheme. Target morphemes disambiguated the message provided by the story, and also tested participant knowledge of meaning distinctions provided by morphology. In this way, it is possible to determine whether participants can comprehend both readings of each story according to the target morpheme in question. For example, in the gender agreement condition the target morpheme disambiguates whether the null subject in question is male or female, as illustrated in example (1) below.

- | | |
|--|---|
| <p>(1) Angela está estudiando con Marcos para la prueba. Está muy preocupada_{fem} / preocupado_{masc}.¹⁹</p> <p>Angela is studying with Marcos for the test. Is very worried_{fem} / worried_{masc}.</p> | <p>According to the sentence, who is very worried?</p> <p>A. Angela
B. Marcos
C. Both of them
D. It's not clear from the sentence</p> |
|--|---|

The accuracy with which RHBs were able to interpret the meaning distinctions expressed by morphology was examined for the following semantic contrasts:

1. Gender morphology: whether the subject is biologically male or female
2. Verbal morphology: whether the story is told from a first person perspective or whether it refers to a third person, in both singular and plural contexts
3. Tense morphology: whether an action is ongoing in the present, or it occurred in the past
4. Aspect morphology: whether something occurred habitually or not in the past
5. Mood morphology: whether an antecedent is known or not to the subject of the story

Participants listening to a total of 72 mini stories (36 minimal pairs) and 14 distractor items, all presented randomly. After listening to each mini story, participants read and responded to the multiple-choice comprehension question in English before progressing on to the next item.

Participants controlled the rate at which they progressed through the task and could rest between items.

¹⁹ Sentences in this condition were balanced so that the target morpheme was in agreement with the first NP half the time, and with the second NP half the time.

In the remainder of this section I present the results of this task. Overall accuracy rates are presented first, followed by accuracy rates by morphological condition. While data for the AHB and MS group has been included, only the results for the Spanish RHB group are discussed in detail unless direct comparison reveals something meaningful about the results.

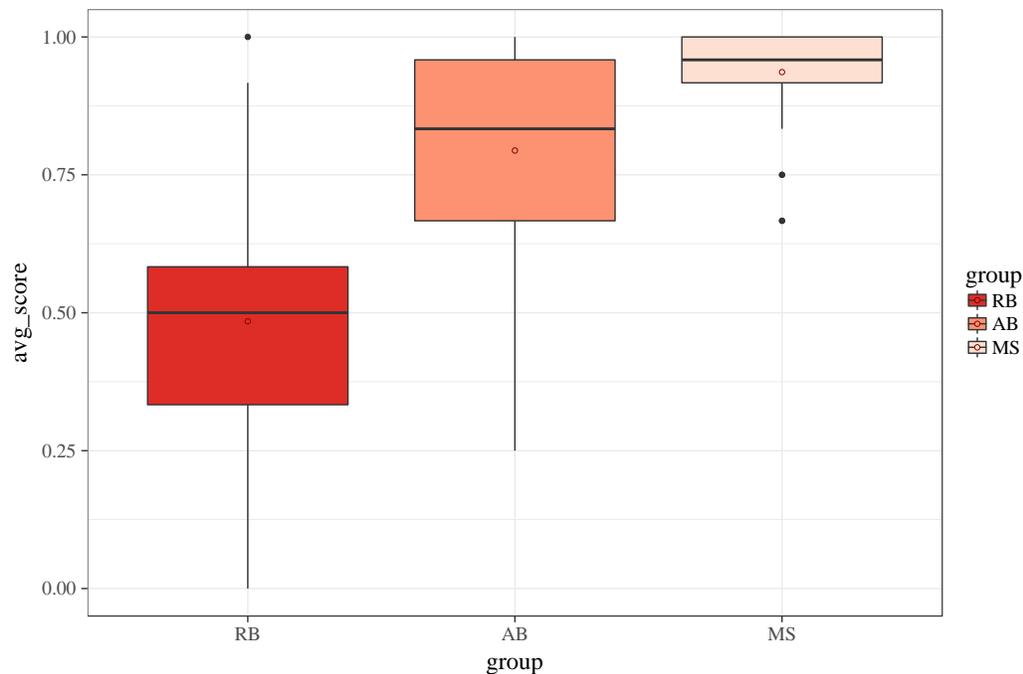
4.6.1 Overall accuracy

Mean accuracy rates, calculated as the percentage of the test items for which participants were able to interpret the semantic information supplied by the target morpheme to correctly answer the comprehension question, are given in the following table and figure.

Table 4-13: Overall average accuracy for the morpheme comprehension task

Participant Group	Mean	Standard Deviation
Spanish RHBs	0.47	0.50
AHBs	0.80	0.40
MS	0.94	0.23

Figure 4-15: Overall average accuracy for morpheme comprehension task



Research question 4 asks whether Spanish RHBs process bound morphemes in order to interpret meaning. It was predicted that participants would be able to process morphemes for meaning, although accuracy would decrease for morphemes acquired relatively late in childhood. The morpheme interpretation task was designed so that selection of the correct answer to the comprehension question following each test item was dependent on the participant having processed elements of meaning supplied by target bound morphemes.

The results of this task show that on average, participants were able to correctly answer the morpheme-dependent comprehension question approximately 47% of the time. Recall from example (1) above and the description of this task in chapter 3, that the comprehension questions following each story were comprised of the question prompt itself as well as four possible answers, presented in a multiple-choice format. As such, chance performance on this task was

25%. Therefore, although their overall accuracy was 47%, Spanish RHBs performed well above chance on this task averaged across all morphological conditions.

To compare accuracy rates for the Spanish RHB group with the comparison AHB group, a linear mixed effects model was run with subject group as the fixed effect and mean accuracy rate as the random effect. Accuracy rates between the Spanish RHB and the AHB group differed significantly. With the Spanish RHB group set as the reference level, the statistical analyses showed that they were approximately 30% less accurate than the advanced bilingual group, and 42% less accurate than the monolingual control group. The following table summarizes the results of the mixed effects model:

Table 4-14: Results of mixed effects model for mean accuracy on aural morpheme interpretation task (Spanish RHB group set as reference level)

Fixed Effects	Estimate	SE	df	t-value	p-value
Intercept	0.51	0.02	82	32.81	<.0001
GroupAB	0.30	0.02	82	13.44	<.0001
GroupMS	0.42	0.04	82	11.75	<.0001

The results thus far do support the prediction that RHBs process morphology for meaning. However, questions 4a and 4b are also concerned with how this ability varies by morphological condition, and what might account for this variation. The remainder of this section is dedicated to reviewing the results of the morpheme comprehension task by morphological condition and semantic contrast.

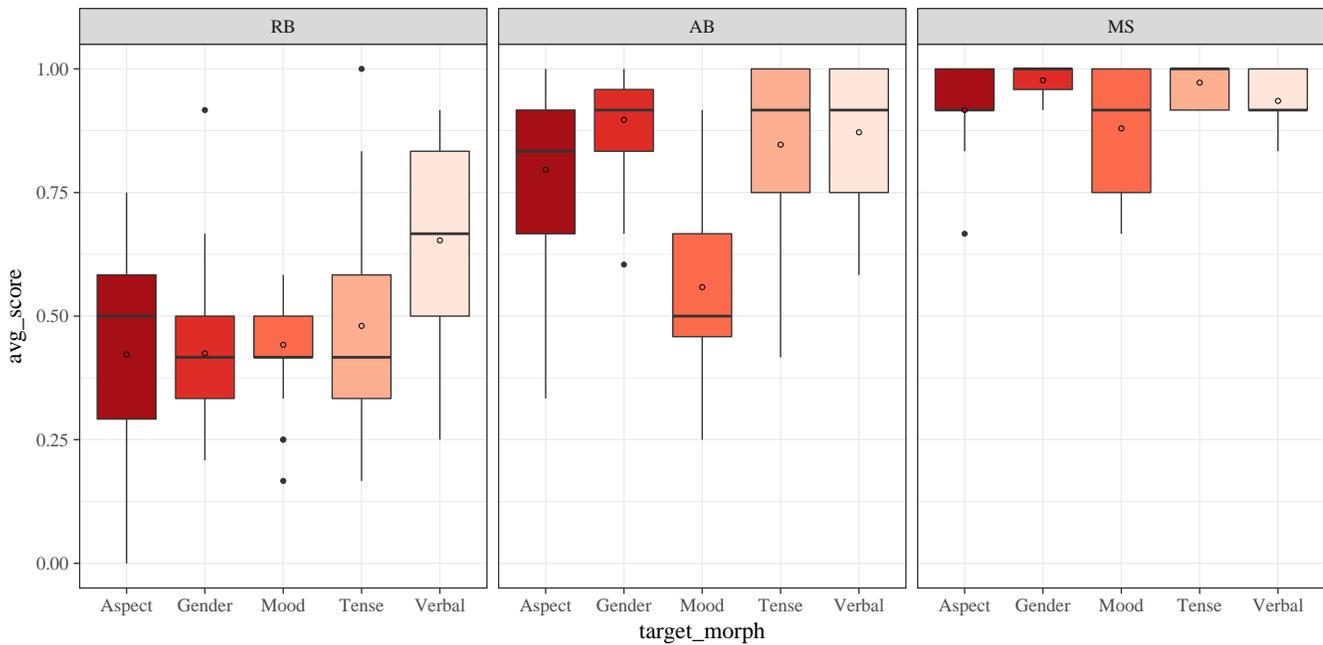
4.6.2 Accuracy by morphological condition

In the following table and figure, average accuracy rates for the morpheme comprehension task are displayed by morphological condition.

Table 4-15: Average accuracy scores by morphological condition - aural morpheme interpretation task

Group	Gender	Verbal	Tense	Aspect	Mood
Spanish RHBs (SD)	0.43 (0.49)	0.65 (0.48)	0.48 (0.50)	0.42 (0.49)	0.44 (0.50)
Spanish AHBs (SD)	0.89 (0.32)	0.87 (0.34)	0.84 (0.37)	0.79 (0.41)	0.56 (0.50)
MS (SD)	0.98 (0.15)	0.94 (0.25)	0.97 (0.17)	0.92 (0.28)	0.88 (0.33)

Figure 4-16: Average accuracy scores by morphological condition on aural morpheme comprehension task



The Spanish RHB group was the most accurate in the verbal morphology condition ($M=.65$), followed by tense ($M=.48$), mood ($M=.44$), gender ($M=.43$) and aspect ($M=.42$). A multiple comparison of means between the morphological conditions was measured for the RHB

group using Tukey contrasts. The results of these pairwise comparisons are summarized in the table below:

Table 4-16: Pairwise comparisons between RHB mean accuracy rates by morphological condition

(significant differences indicated with asterisk):

Comparison of conditions	Estimate	SE	z-value	p-value
Gen – Asp	0.00	0.03	0.07	1.000
Mood – Asp	0.02	0.03	0.61	0.974
Vrb – Asp	0.23	0.03	7.18	< 0.001*
Tense – Asp	0.06	0.03	1.81	0.371
Mood – Gen	0.02	0.03	0.54	0.983
Vrb – Gen	0.23	0.03	7.11	< 0.001*
Tense – Gen	0.06	0.03	1.73	0.413
Vrb – Mood	0.21	0.03	6.57	< 0.001*
Tense – Mood	0.04	0.03	1.20	0.754
Tense – Vrb	-0.17	0.03	-5.38	< 0.001*

Recall from the analysis of the aural, self-paced grammaticality judgment task that Spanish RHBs were predicted to be most sensitive to grammaticality in the subject/verb agreement and gender conditions, which both stabilize around the age of 3 years in childhood. The prediction was that sensitivity to grammaticality would decrease as reflected by accuracy rates in the present/preterit tense condition, which stabilizes around 4 years, followed by the aspect and mood conditions which both stabilize around the age of 7+. The direction of the results for the GJT followed this prediction.

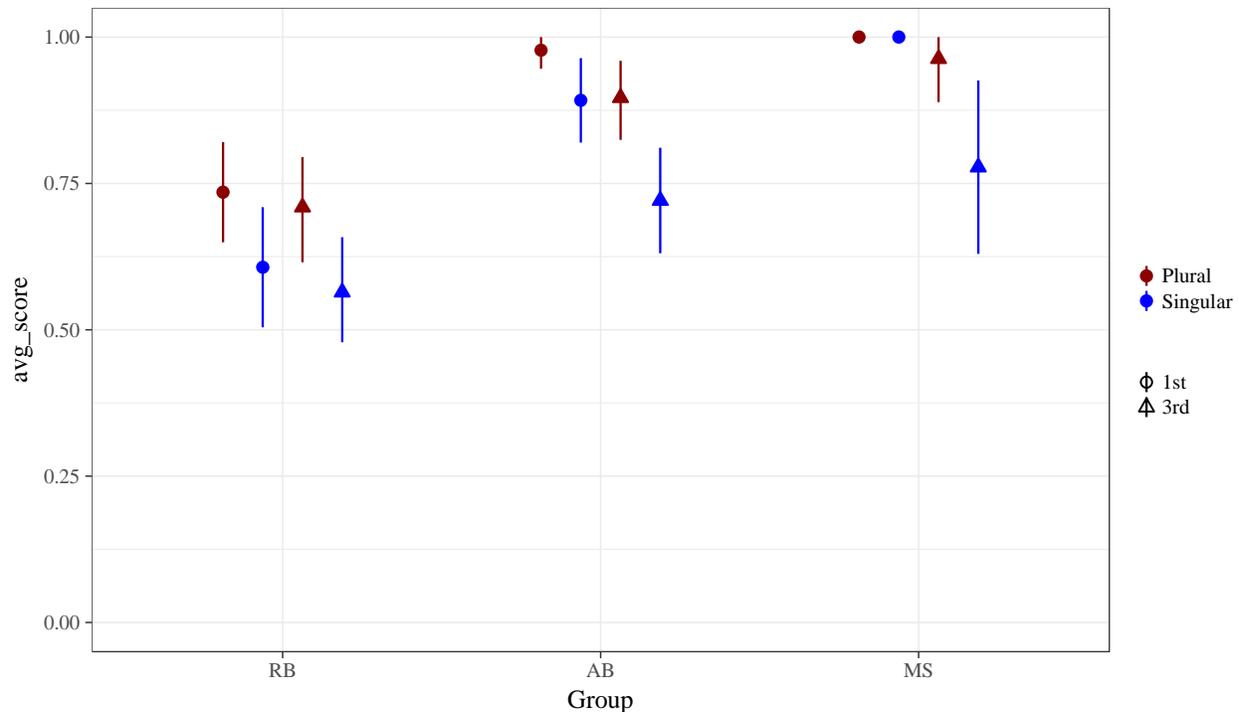
The results of the morpheme comprehension task were also predicted to follow this same trend, and with one exception, the data supported this prediction. Similar to the results of the GJT, Spanish RHB accuracy on the morpheme comprehension task was significantly higher in the verbal morphology condition, and no significant differences in accuracy were found between

the other four morpheme conditions (see Table 4-16 above). However, while accuracy on the GJT decreased as predicted in relation to morpheme conditions and patterns of acquisition in childhood, the pattern of results was slightly different for the morpheme comprehension task. More specifically, mean accuracy for the RHB group in the gender condition ($M=.43$) was the second lowest of all the morphological conditions, trailing that of both tense and mood and only slightly outpacing that of the aspect condition ($M=.42$) even though gender morphology is acquired early in childhood. These results will be analyzed in greater detail below as part of the discussion of performance by morpheme condition and by the semantic contrasts tested in each condition.

Verbal morphology – person and number

As predicted, Spanish RHBs were most accurate in the verbal morphology condition on the morpheme comprehension task, with a mean accuracy score of $M=.65$. Of the five different morphological conditions tested, verbal morphology is the one of the first acquired in childhood. Recall that subject/verb agreement emerges in production as early as 2 years of age in bilingual children (Austin, 2001; Silva-Corvalán, 2014), and in monolingual Spanish-speaking populations, is perfected by the age of 3 (Clahsen et al, 2002). Additionally, in childhood acquisition, first and third person plural forms are the first to emerge, with first person plural being more frequent in production than third person (Bel, 2001; Anderson, 2001). Accuracy results in the verb morphology condition suggest that the semantic contribution of subject/verb agreement morphemes was the easiest for Spanish RHBs to interpret. The following figure shows the average accuracy in the subject/verb agreement condition by person (1st and 3rd) and number (singular and plural).

Figure 4-17: Average accuracy on morpheme comprehension task – verbal morphology



Although all participant groups were generally more accurate interpreting items containing 1st versus 3rd person morphemes, grammatical person was not significant for the Spanish RHB group ($X^2(1) = 0.65$; $p = 0.42$). These results are supported by the literature described above, as 1st and 3rd person emerge around the same time in childhood. There was a main effect of grammatical number for the Spanish RHB group, and these participants interpreted plural verbal morphemes significantly more accurately than singular morphemes regardless of grammatical person ($X^2(1) = 10.93$; $p < 0.001$). Plural forms are more frequent in childhood production, and it is possible that Spanish RHBs received more frequent exposure to plural forms in the Spanish input they received as children, resulting in their comparative ease of interpreting in comparison to singular forms. A main effect of grammatical number was similarly

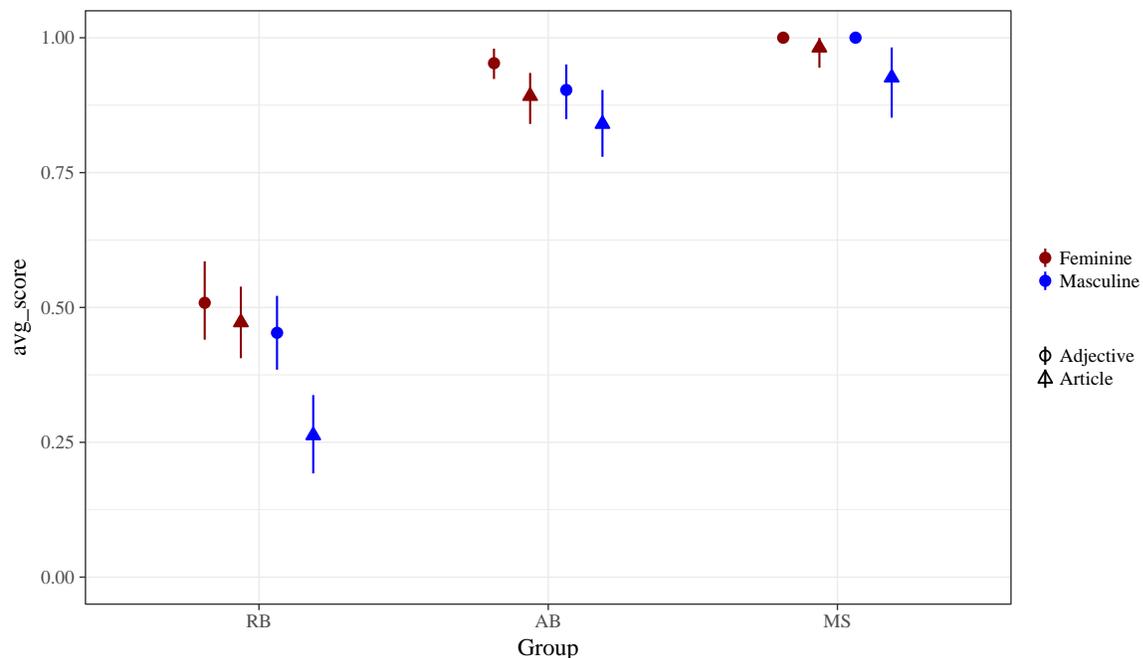
found for AHB group, who also whose accuracy was also higher for plural morphemes $X^2(1) = 13.35$; $p < 0.001$.

Although higher accuracy for 1st versus 3rd person verbal morphology was not statistically significant for the RHB group, it was for both the AHB and MS groups (AHB: $X^2(1) = 16.37$; $p < 0.001$, MS: $X^2(1) = 4.22$; $p < 0.05$). All verbal morphology in the stimuli for this condition was in the present tense. One possible explanation for these findings is that despite emerging at the same time in childhood, Spanish 1st person present tense verbal morphology (which would include the morphemes *-o/-amos/-emos/-imos*) is phonologically more salient than 3rd person morphology (*-a/-e/-an/-en*). Additionally, although the MS data was not intended to be compared directly to the heritage bilingual data, it nevertheless revealed a two-way interaction that may provide evidence that phonological salience played a role in these results. A significant interaction between grammatical number and person revealed that the accuracy differences between singular and plural morphemes are exaggerated by the abnormally low scores that the MS group received for 3rd person singular morphemes ($X^2(1) = 4.78$; $p < 0.05$). Accuracy discrepancies were the largest in this condition for all three groups when comparing 3rd person singular (*-a/-e*) and 3rd person plural (*-an/-en*) verbal morphemes, which differ by just the single phoneme /n/. Since all three groups were least accurate in the 3rd person singular condition, it is possible that the /n/ in the 3rd person plural morpheme provides the phonological salience necessary in order to communicate the plural semantic information.

Gender

Spanish gender morphology emerges relatively early in childhood (around 17 or 18 months), and in monolingual children stabilizes at 3-4 years of age (Hernández Pina, 1984; López Ornat, 2003; Lleo, 2001). In bilingual children difficulties with gender agreement can persist into the grade school years and beyond (Anderson, 1999a, 1999; Martínez-Gibson, 2011; Montrul & Potowski, 2007; Montrul et al., 2008, 2014; Polinsky, 2008). Due to the early emergence of gender agreement, the Spanish RHBs in this study are predicted to be better able to interpret gender morphology for meaning than they are structures that emerge later in childhood, such as tense, aspect or mood morphology. The following figure displays average accuracy in the gender condition by the two grammatical Spanish genders (feminine and masculine) and by whether gender was lexically assigned by the determiner (the article) or expressed syntactically as an inflectional morpheme on the adjective.

Figure 4-18: Average accuracy on morpheme comprehension task – gender agreement



Recall that on average Spanish RHBs were able to interpret gender morphology for meaning 43% of the time (refer to Table 4-15 earlier in this section for average accuracy rates by morphological condition). Also remember that chance performance on the morpheme comprehension task is 25%, so these results indicate that Spanish RHBs are able to interpret gender morphology for meaning when listening to spoken Spanish. What this specifically means in this condition is that they were able to determine whether an invariant noun referred to a biologically male or female person according to the determiner (el artista/la artista), or whether a null subject was biologically male or female as expressed by an inflectional gender morpheme on a post verbal adjective (Está muy cansado/Está muy cansada).

Recall that accuracy rates did not differ between the morpheme classes in the morpheme comprehension task except for in the subject/verb agreement condition (see Table 4-16), in which RHB performance was statistically most accurate. Additionally, RHBs were less accurate in the gender condition than they were in the aspect condition despite aspect emerging and stabilizing later in childhood than gender agreement. This disagrees with the prediction that order of acquisition would predict certain patterns of performance between morpheme conditions on this task, and reasons for this incongruence will be examined in the more detailed analysis of this condition that follows.

A linear mixed effects model revealed a main effect of group ($X^2(2) = 141.83, p < .0001$), gender ($X^2(1) = 18.90, p < .0001$), and place ($X^2(1) = 19.46, p < .0001$). Accuracy for the RHB group was significantly less than the other two groups. Overall, participants were more accurate on items containing feminine rather than masculine gender morphology, and were more accurate when gender agreement was marked on the adjective rather than the article. Post hoc Tukey

contrasts reveal that these results held for the Spanish RHB group. RHBs are significantly more accurate when interpreting feminine rather than masculine gender markers ($p < .0001$), and are more accurate interpreting gender agreement on the adjective rather than gender assignment by the determiner ($p < .0001$). These results are at odds with both theoretical literature, in which masculine grammatical gender is both the unmarked or default form (Harris, 1991; McCarthy, 2008) and language acquisition literature which has documented overextension of masculine forms and better performance with determiner/noun assignment versus noun/adjective agreement (Alarcón, 2011; Cuza & Pérez-Tattam, 2016; Montrul & Potowski, 2007; Montrul et al., 2008).

The mixed effects model also revealed a three-way group by gender by place interaction ($X^2(1) = 4.35, p < .05$) that may help explain these somewhat surprising results. Follow up t-test show that RHBs were significantly less accurate when masculine (rather than feminine) grammatical gender was assigned by the article. No significant gender effect was found between masculine and feminine agreement morphemes on the adjective for the RHB group, however. This is most likely due to the inclusion of invariant animate nouns in the stimuli to test gender assignment. These nouns, many of which ended in “-a” (artista, poeta, guía) were included as subjects in the stimuli to measure how accurately participants would interpret the biological gender of their referent when lexically assigned by the article (el artista = male artist/la artista = female artist). RHB accuracy was particularly low when these invariant nouns were paired with masculine articles.

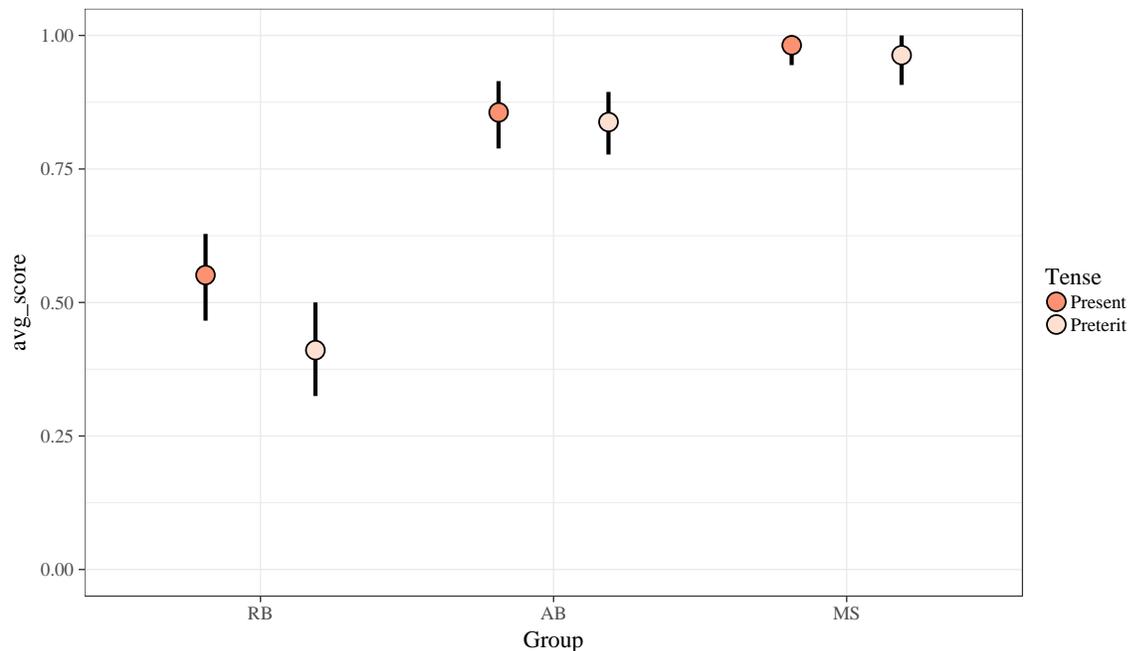
One possible explanation for the low accuracy on these items is that Spanish RHBs interpreted the invariant nouns ending in “-a” as canonically feminine, regardless of the gender of the article. Considering Spanish RHBs’ comparatively limited proficiency, it is possible that

they do not have the sufficient lexical knowledge to understand that invariant nouns can refer to a person of either biological gender, and that gender is disambiguated syntactically via the determiner. Results for the ABH and MS group support this hypothesis, as the difference in accuracy between masculine and feminine determiners was not statistically significant for either group (AHB: $p=0.06$, MS: $p=0.25$). The general trend of lower accuracy for items with invariant nouns and masculine articles, coupled with the fact that these items were particularly problematic for the Spanish RHB group, most likely accounts for the unanticipated low accuracy for gender overall.

Tense

Past tense morphology emerges simultaneously or soon after present tense morphology at approximately 2 years of age for monolingual children, and has been shown to lag slightly in bilingual children (Bell, 2001; Ezeizabarrena, 1997). Initially, the preterit is used exclusively to refer to events in the past (Montrul, 2004) and while children show a preference for the present versus the preterit tense initially, they do not overgeneralize their use of it (Bel, 2001). Tense distinctions are reliable in monolingual children by the age of 4 (Pérez-Pereira, 1989; Sebastián & Slobin, 1994). Since tense distinctions stabilize slightly later than subject/verb agreement or gender agreement, the ability of Spanish RHBs to interpret tense morphemes for meaning was predicted to trail behind that of verbal and gender morphology, and to exceed that of aspect and mood morphology, which do not stabilize fully until approximately the age of 7+. The following figure displays average accuracy in the tense condition by present versus preterit morphology.

Figure 4-19: Average accuracy on morpheme comprehension task – tense morphology



Test items in the tense condition determined whether Spanish RHBs were able to interpret present- and preterit-tense morphemes to determine whether an action was ongoing in the present, or whether it had occurred in the past. Average RHB accuracy in this condition was $M=48\%$, which is well above chance performance in this task of 25%. As predicted, accuracy in the tense condition was greater than that of the aspect or mood condition, although this difference was not significant (see Table 4-16). RHBs were statistically less accurate in the tense condition than the subject/verb agreement condition, which is also in agreement with the prediction. Lastly, while accuracy in the tense condition was predicted to be lower than in the gender condition, the results for the Spanish RHBs were actually the opposite, although differences between tense and gender were not statistically significant. As was discussed in the previous analysis of the gender condition, this is likely due to poor performance on those items containing both an invariant noun ending in “-a” and the masculine determiner “el”.

A linear mixed effects model for the tense condition revealed a main effect of group ($X^2(2) = 74.60, p < .0001$) and tense ($X^2(1) = 4.69, p < .05$). Spanish RHBs were significantly less accurate overall than the other two groups, and overall accuracy was greater for present rather than past tense morphology. Follow up t-tests showed that while no significant differences in accuracy were found between the present and the preterit tense morphemes for the AHB or MS group (ABH: $t(36) = -0.532, p = 0.598$, MS: $t(16) = -0.603, p = 0.555$), Spanish RHBs were significantly more accurate for those items containing present versus preterit tense morphemes ($t(76) = -2.23, p < .05$), as would be expected due the fact that present tense morphology emerges first in childhood.

Aspect

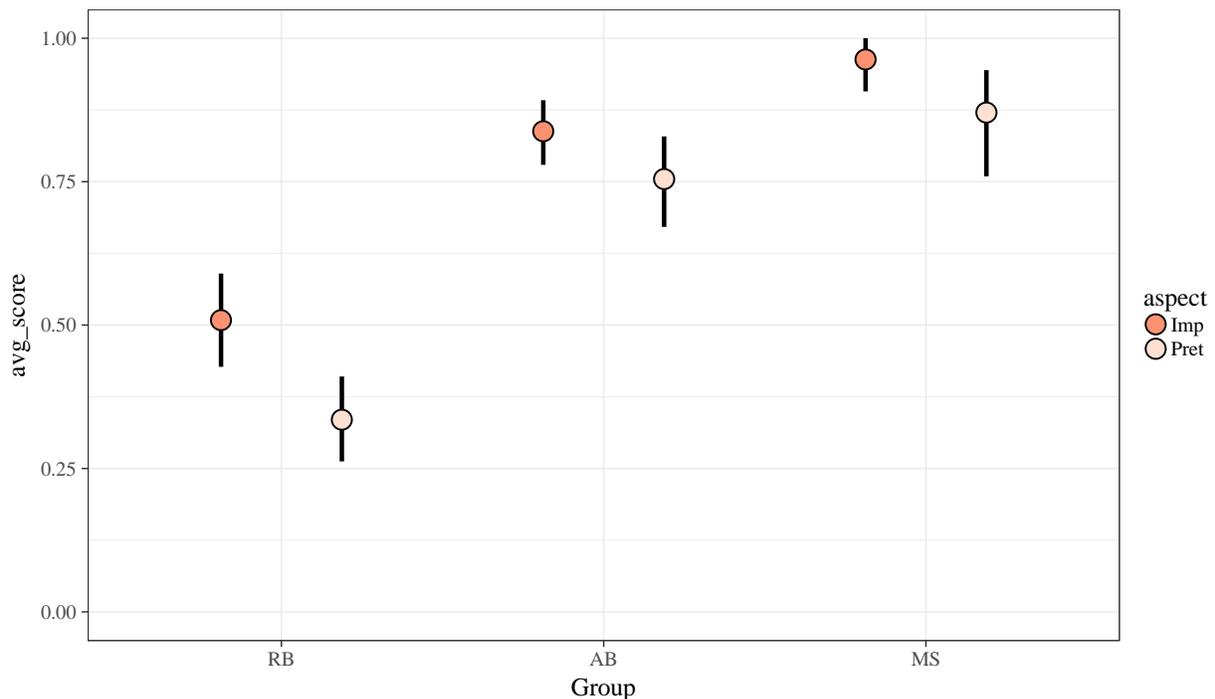
Monolingual, Spanish-speaking children begin to express preterit/imperfect aspectual distinctions around the age of 3 years, but initially show little understanding of the semantics conveyed by these distinctions (Hodgson, 2005). Imperfect morphology emerges after preterit morphology, as it is semantically more complex (Montrul, 2009), and aspect distinctions stabilize around 7-8 years of age (Fernández-Martínez, 1994; Hodgson, 2005, Montrul, 2004a). In spontaneous L1 production, the preterit emerges first with telic predicates of accomplishment and achievement, followed by the imperfect with atelic predicates of states and activities.

Studies of heritage bilinguals have found that the acquisition of aspect and mood distinctions in childhood is particularly vulnerable (Montrul, 2002, 2007, 2009; Silva-Corvalán, 1994b, 2014), and difficulties in both production and comprehension persist into adulthood (Montrul, 2009). Various explanations for these results have been suggested, such as that they result from a shift in language dominance to English due to schooling prior to full acquisition of

these forms, or that vulnerability of the morphology-syntax interface is responsible (Montrul, 2009).

Due to the late acquisition of aspect and mood morphology, accuracy for the Spanish RBH group on the morpheme comprehension task was therefore predicted to be the lowest for these two conditions. The aspect condition was designed to determine whether Spanish RHBs are able to interpret aspect morphology to determine whether target structures express a completed (preterit morphology) versus a habitual (imperfect morphology) action in the past. The following figure displays average accuracy in this condition by grammatical aspect.

Figure 4-20: Average accuracy on morpheme comprehension task – aspect morphology



In the aspect condition, Spanish RHBs were able to accurately determine that preterit forms referred to completed actions in the past, and imperfect forms referred to habitual forms in

the past for approximately $M=42\%$ of the items. Although the RHB group scored above chance performance of 25%, their accuracy in the aspect condition was the lowest of all morphological conditions tested. (refer to Table 4-15). Low overall accuracy in this condition for the RHB group is in line both with previous studies that have shown aspect to be particularly challenging for heritage bilinguals (Montrul, 2009), and with the predication that Spanish RHBs would be least accurate for structures acquired the latest in childhood.

A linear mixed effects model for the aspect condition revealed a main effect of group ($X^2(2) = 52.66, p < .0001$) and aspect (preterit versus perfect: $X^2(1) = 15.72, p < .0001$). Spanish RHBs were significantly less accurate overall than the other two groups, and overall accuracy was greater for imperfect versus preterit morphology. That accuracy scores are generally higher for imperfect rather than preterit aspect are surprising. As previously mentioned, imperfect morphology emerges after preterit morphology, a phenomenon which has been attributed to its semantic complexity in comparison to that of preterit morphology. As such, it could be reasonably expected that participants, and particularly the RHBs, would be able to more accurately comprehend preterit rather than imperfect aspect morphemes. However, follow up t-tests revealed that both the RHB and ABH groups were significantly less accurate for preterit morphology (RHB: $t(76) = -3.04, p < .05$), AHB: $t(36) = -2.53, p < .05$). Scores for the MS group were also less accurate for preterit morphology, although this difference was not significant ($t(8) = -2.294, p = 0.509$). These results contradict other studies of heritage grammars, which have found more robust knowledge of the preterit than imperfect aspect (Montrul, 2009). Similar to the results of the GJT, it is possible that the test items did not provide sufficient

context to allow participants to accurately interpret morphemes communicating aspect distinctions.

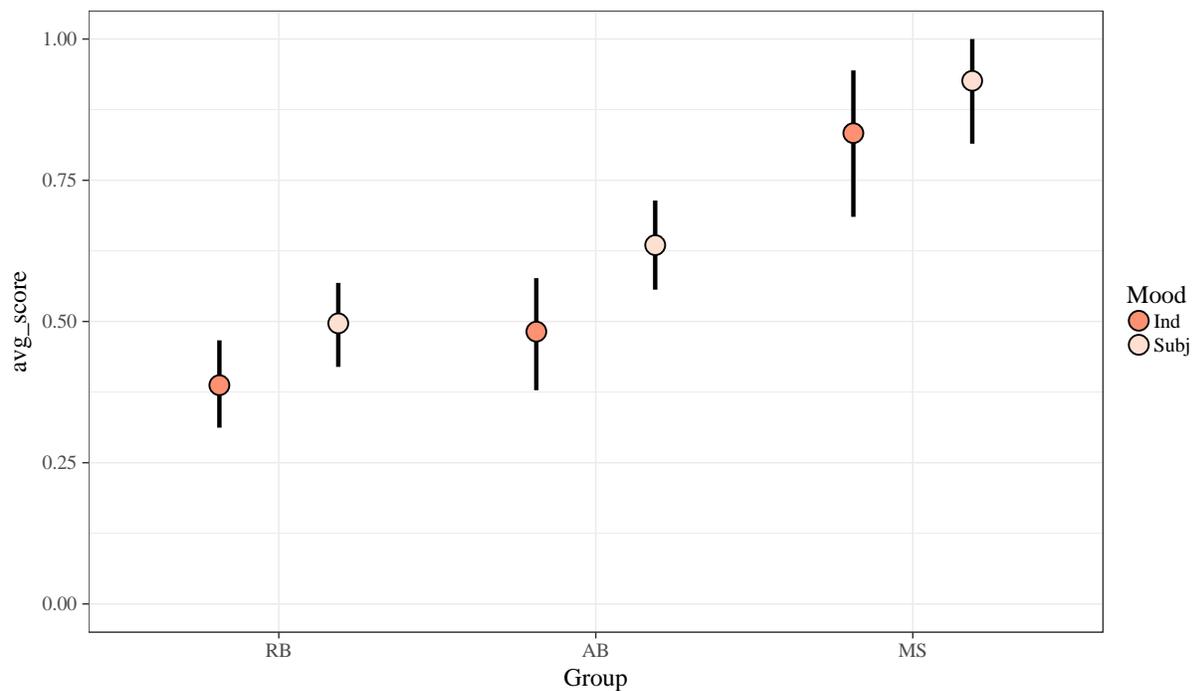
Mood

The subjunctive mood emerges in monolingual children by the age of two, however mood morphology does not stabilize until approximately the age of at least 7, with some studies suggesting that mood distinctions are not fully acquired until adolescence (Blake, 1983; Hernández Pina, 1984; López Ornat et al. 1994; Martínez-Mira 2009; Pérez-Leroux, 1998; Silva-Corvalán, 1994b, 2003). As was mentioned above in the discussion of the aspect condition, the production and interpretation of aspect and mood morphology are greatly affected for heritage bilinguals. Studies of production data have shown that low proficiency speakers may not produce subjunctive forms at all (Silva-Corvalán, 1994b; Montrul, 2007), and more proficient heritage bilinguals experience difficulty producing and interpreting the semantics expressed by mood morphology, particularly the subjunctive in variable contexts (Montrul, 2007). Accuracy rates for the Spanish RHB group are therefore predicted to be the lowest of all the morphological conditions tested by the morpheme comprehension task.

Recall that this task was designed so that processing of semantic contrasts could be compared and tested using minimal “mini story” pairs that only differed by the target morpheme (masculine versus feminine gender morphology, present versus past tense morphology, etc.) As such, a non-obligatory semantic/syntactic context had to be identified in which indicative/subjunctive mood contrasts between the minimal story pairs communicated a difference in meaning, rather than merely rendering one of the stories ungrammatical. For that reason test items in this condition were structured so that they contained mood morphology

embedded in adjectival clauses which disambiguated whether the antecedent was known or unknown to the subject. Because previous studies have shown that heritage bilingual knowledge of mood distinctions in variable contexts is particularly affected, and mood distinctions in adjectival clauses are comparatively infrequent in production data (Silva-Corvalán, 1994b; Martínez-Mira, 2009), it is possible that accuracy rates for the Spanish RHB group would be particularly low in this condition. The following figure displays average accuracy in the mood condition by indicative versus subjunctive morphology.

Figure 4-21: Average accuracy on morpheme comprehension task – mood morphology



As was mentioned above, test items in the mood condition measured whether Spanish RHBs were able to interpret present indicative and subjunctive morphemes to determine whether an antecedent in the main clause of the sentence was known to the subject. Average RHB

accuracy in the mood condition was $M=.44$, which exceeded chance performance of 25%. Contrary to the prediction that accuracy would be lowest for the group in this condition, RHBs performed slightly better in the mood condition than the gender or aspect condition, although these differences in accuracy were not statistically significant (refer to Table 4-16). Similar to the results of the aspect condition, low overall accuracy in the mood condition is in line with both previous literature and my prediction that Spanish RHB accuracy would be particularly affected for this late emerging and semantically complex morphological distinction.

A linear mixed effects model for the mood condition revealed a main effect of group ($X^2(2) = 36.71, p < .001$) and mood morphology ($X^2(1) = 10.09, p < .01$). Spanish RHBs were significantly less accurate overall than the other two groups, and overall accuracy was greater for subjunctive rather than indicative mood. The direction of these results is surprising in light of the fact that the subjunctive mood emerges later in childhood. Also, the production and interpretation of subjunctive morphology in optional contexts is an area of grammatical knowledge known to be particularly affected for heritage bilinguals. While all three participant groups were more accurate in the subjunctive condition, follow up t-tests showed this difference was only accurate for the ABH group ($t(72) = 2.33, p < .05$). Accuracy differences between the mood morphemes approached significance for the RHB group ($t(76) = 1.92, p = .059$).

One possible explanation for the comparatively higher accuracy scores for subjunctive morphemes is that the specific way in which test items in this condition were constructed led participants to prefer the meaning expressed by subjunctive morphology. Each of the mini stories in the mood condition described a subject who is looking for something. If the adjectival clause contained indicative morphology, then participants should have interpreted that the existence of

antecedent was known to the subject. If the adjectival clause contained subjunctive morphology, this communicated that the antecedent was not known to the subject. Considering the context of these items, it is possible that participants disregarded morphological structure entirely and assumed that the subject did not know whether the antecedent in question existed. This would have resulted in participants getting more of the subjunctive rather than the indicative items correct, which was the exact pattern found in the data.

4.6.3 Summary of findings for research question 4

As previously mentioned, the results of the aural self-paced grammaticality judgment task indicated that morphology does form part of Spanish HRBs' underlying grammatical systems. However, it does not test whether or not those morphemes are processed for meaning when participants hear Spanish. Research question 4 is therefore concerned with the role that morphology plays in participants' ability to comprehend the specific meaning those morphemes convey. Similar to the results of the GJT, Spanish RHBs performed above chance in all morpheme conditions, although accuracy was greater for morphology acquired early in childhood rather than later. Participants were most accurate in the verbal morphology condition, followed by the tense, mood, gender and aspect conditions. Accuracy in the verbal morphology condition was significantly higher than that of all other conditions, which followed the expected trend despite the lack of statistically significant differences between some of the morpheme conditions. While those structures for which participants were most and least accurate (verbal morphology and mood morphology, respectively) in the morpheme comprehension task mirror the results of the GJT task, accuracy in the gender condition in the morpheme comprehension

task was comparatively and surprisingly lower in relation to the other morpheme. Accuracy for gender is lower than that of tense, and a possible explanation for these unexpected results is the effect that the inclusion of invariant nouns ended in in “-a” had on the results.

In relation to the semantic distinctions tested for each condition, in the verbal morphology condition, accuracy rates did not differ significantly as a function of grammatical person, but they did for grammatical number. RHBs were significantly more accurate identifying when the subject was plural than they were when the subject was singular. One explanation for the number effect, as mentioned previously, is that the higher frequency of plural forms in childhood production reflect the greater frequency of these forms in the input, which may affect how they are acquired.

In the gender condition, overall RHB accuracy was affected by the fact that they were exceptionally inaccurate when identifying the biological gender of the referent when that gender was masculine and assigned by the article, although the opposite would be expected according to previous studies (Harris, 1991; McCarthy, 2008; Montrul et al., 2008). As has been mentioned, these results are due specific items in the stimuli. Specifically, participants experienced particular difficulty correctly interpreting the biological gender of the referent when invariant nouns ending in “-a” was preceded by a masculine article. This is most likely due to participants interpreting these nouns as canonically feminine, regardless of the gender being assigned by the determiner.

While examining tense morphology distinctions, RHBs show greater difficulty determining when a verb refers to an action in the past versus in the present. This is supported by the literature which has shown that the preterit tense emerges after the present, and that it

emerges later in bilingual in comparison to monolingual children (Bell, 2001; Ezeizabarrena, 1997).

When aspect distinctions were analyzed, RHBs were surprisingly more accurate when identifying habitual actions in the past expressed by imperfect morphology than they were when identifying completed actions in the past as indicated by preterit morphology. One possible explanation for this is that because the contextual information provided by the test items in this task was limited, imperfect morphology was less ambiguous for participants.

Lastly, the accuracy rates for the mood distinctions tested showed that RHBs more accurately answered follow up questions for items in which the antecedent was not known to the subject, as indicated by subjunctive morphology. This trend was similar for all the participant groups, despite the fact that mood morphology stabilizes particularly late in childhood, and that the specific mood distinction tested is very infrequent in heritage production data (Blake, 1983; Hernández Pina, 1984; López Ornat et al., 1994; Martínez-Mira, 2005; Pérez-Leroux, 1998; Silva-Corvalán, 1994b, 2003). As previously mentioned, this was most likely due to the semantic context of these specific test items.

4.7 Correlations between experimental tasks

Research Question 5: What do correlations between the experimental tasks suggest about the interrelatedness of the skills and knowledge that they evaluate?

Research question five is concerned with the strengths of correlations between the results of the experimental tasks, and whether they reveal anything additional about the grammatical systems of Spanish RHBs. Although all tasks used aurally-presented Spanish to evaluate the knowledge of RHBs, the knowledge tested and methodology differed between the laboratory

tasks. By testing the linear relationship between the four experimental tasks, inferences can be drawn about the interrelatedness of the domain-specific knowledge tested in this study, as well as the role that other factors, such as working memory, may play in performance.

A test using Pearson's correlation was run to determine the linear relationship between the four different experimental tasks. In order to do this, a single representative score was calculated per participant and per task. For the aural, self-paced GJT and the morpheme comprehension task, overall percentage accuracy by participant was used. For the global comprehension and elicited imitations tasks, total points scored per participant were used. Results of the Pearson's correlation test for the RHB group are shown below:

Table 4-16: Results of Pearson's correlation test between the four experimental tasks

		Correlations			
		GlobalComp	Elicitmit	GJT	MorphComp
GlobalComp	Pearson Correlation	1	.723**	.534**	.567**
	Sig. (2-tailed)		.000	.002	.001
	N	32	32	32	30
Elicitmit	Pearson Correlation	.723**	1	.655**	.784**
	Sig. (2-tailed)	.000		.000	.000
	N	32	33	33	31
GJT	Pearson Correlation	.534**	.655**	1	.547**
	Sig. (2-tailed)	.002	.000		.001
	N	32	33	33	31
MorphComp	Pearson Correlation	.567**	.784**	.547**	1
	Sig. (2-tailed)	.001	.000	.001	
	N	30	31	31	31

** . Correlation is significant at the 0.01 level (2-tailed).

The results reveal a significant and positive correlation between all four of the experimental tasks, as would be expected since they all test some element of RHBs' knowledge of Spanish. However, some correlations are more robust than others. The strongest correlation exists between the morpheme comprehension task and the elicited imitation task ($r = 0.784$, $p < .001$). That is, the more accurate participants are in interpreting the meaning supplied by morphemes the higher they score on test of proficiency. Correlations between these two tasks accounted for approximately 61.47% of the variation in each. The second strongest correlation was between the global comprehension and the elicited imitation task ($r = 0.723$, $p < .001$). This indicates that the more accurately participants are able to comprehend spoken Spanish, the higher their proficiency scores. The correlations between these two tasks account for 52.27% of the variation in each. So far, the correlations show that proficiency is related to both the ability to process the semantics supplied by morphology, and to a lesser degree, the ability to understand conversational Spanish. The fact that these three tasks are interrelated is not surprising, and does not necessarily reveal anything new in the data. However, what might explain the stronger correlation between morpheme processing ability and proficiency, than overall aural comprehension skills and proficiency? One possibility is the elicited imitation task privileges knowledge of morphosyntax over listening comprehension ability. However, since the criteria used to score the elicited imitation task evaluated participants' ability to reproduce both the structure and idea units in each of the sentences participants heard, this is unlikely. Another more likely possibility is that differences in the demands of the tasks might explain the differences in correlation strengths between them. More specifically, demands on working memory may help explain the patterns of the correlations. All three of these tasks require that participants parse and

hold the stimuli in working memory, comprehend what they have heard, and respond accordingly. Test items in the elicited imitation task and morpheme recognition task were much shorter in length than were the contextualized conversations that participants heard as part of the aural comprehension task. The higher working memory demand for the aural comprehension task may explain its comparatively weaker correlation with proficiency in comparison to the morpheme recognition task. Task demands may also explain the weakest correlation found, which was between the aural, self-paced GJT and the listening comprehension task ($r = 0.534$, $p < .05$). While the ability to determine the morphological well-formedness of an utterance is positively related to the ability to understand spoken conversational Spanish, only 28.52% of the variation in performance on one task was related to variation in the other. That said, not only were the test items shorter for the GJT than they were in the listening comprehension task, but they also did not require that participants attend to meaning. The GJT was the only task that did not test participant's comprehension of what they had heard, and so it follows that correlations between the GJT and the other three tasks would be weaker than correlations among the three other tasks.

Recall that one of the overarching questions guiding this research is how the grammatical systems of Spanish RHBs support their ability to comprehend spoken Spanish. When comparing correlations between the comprehension task and the other three tasks, these results show that global comprehension is most strongly correlated with the elicited imitation task ($r = 0.723$, $p < .001$), and is most weakly correlated with the GJT ($r = .534$, $p < .05$). The elicited imitation task is most strongly correlated with the morpheme comprehension task ($r = 0.784$, $p < .001$) and is also most weakly correlated with the GJT ($r = .655$, $p < .001$). It therefore follows that listening

comprehension ability is most closely related to proficiency, and proficiency is most closely related to the ability to process morphology for meaning. How might the fact that the GJT was weakly correlated with both these tasks be explained, particularly since average accuracy in the GJT was higher overall for the Spanish RHB group than it was for the morpheme interpretation task? One additional possibility is that the patterns found in these correlations reveal vulnerabilities in the integration of syntax and semantics, also known as interface vulnerability of the Interfaces Hypothesis (Montrul, 2009; Sorace & Filiaci, 2006; Tsimpli & Sorace, 2006; Tsimpli, Sorace, Heycock & Filiaci, 2004). Consider the fact that RHBs are more easily able to determine if a morpheme is grammatical or not than they are able to interpret the meaning provided by morphology, however the latter ability is more strongly correlated with proficiency and listening comprehension abilities. This suggests that knowledge of the complexity of the meaning supplied by morphology is more closely related to participant proficiency and listening comprehension ability than is knowledge of underlying grammatical well-formedness, as would be predicted by the Interfaces Hypothesis. This possibility is discussed further in Chapter 5.

4.7.1 Summary of findings for research question 5

Although significant correlations were found between all the experimental tasks in the study, the strength of these linear relationships varied. Measures of proficiency, listening comprehension, and the ability to interpret morphology were most strongly correlated. The ability of RHBs to determine whether sentences were grammatical or not based on morphology was weakly correlated with proficiency and listening comprehension abilities. One possible explanation for this is that the working memory task demands were less for the GJT than they

were for the other three tasks, and the GJT did not test participant comprehension in the same way as did the other tasks. Another possibility is that differences in accuracy between the GJT and the morpheme comprehension task reveal vulnerabilities in acquisition that are affected by the syntax/semantics interface. I return to these results in Chapter 5 to discuss how they fit with the various theories that have been put forth to account for heritage grammars.

4.8 Summary of Empirical Data

In this chapter I have presented the results of the four different experimental tasks used to examine the language abilities of Spanish RHBs and to answer the specific research questions. A contextualized comprehension task was administered to determine how well RHBs were able to extract meaning from conversational, spoken Spanish. As predicted, the results show that RHBs do understand the majority of what they hear. The elicited imitation task revealed that despite their limited speech abilities and formal literacy skills in Spanish, that Spanish RHBs nevertheless perform at the upper end of the “low” proficiency category or higher. Proficiency was predicted to be low overall for the Spanish RHB group, and participants were more proficient than expected. The aural, self-paced GJT provided evidence that Spanish RHBs can distinguish between grammatical and ungrammatical morphology, which indicates that the rules governing morphological well-formedness form part of their underlying grammatical system. As predicted, RHBs are less sensitive to the grammaticality of morphemes which are acquired relatively late in childhood. Spanish RHBs are also able to interpret the meaning supplied by bound morphemes and to distinguish between semantic contrasts. Results of the morpheme comprehension task mirrored those of the GJT, and RHBs were less accurate in interpreting meaning for those morphemes that are acquired relatively late in childhood. A test using

Pearson's correlation showed significant linear relationships between all four experimental tasks, however the results of the GJT were most weakly correlated with results of the other three tasks. While task demands may help explain these results in part, another possible explanation is that the interrelatedness of these tasks rests on the access that participants have to the meaning provided by bound morphemes. This possibility is discussed further in the following chapter.

In chapter 5, I review these results from a macro perspective in order to situate them in relation to the research questions, predictions, and what is known about the language skills of heritage bilinguals. I also summarize the results broadly in order to answer research question 6, which is concerned with how the language abilities of Spanish RHBs should be best characterized.

CHAPTER 5 – DISCUSSION AND CONCLUSIONS

5.1 Introduction

In this chapter I bring together the results of the different experimental tasks to provide an explanatory picture of the linguistic abilities of Spanish RHBs. The overarching purpose of this study was to gain a deeper understanding of the nature of the grammatical, and more specifically morphological, knowledge of these bilinguals. The results of this study show that Spanish RHBs are able to understand the majority of what they hear in spoken Spanish and have low to intermediate proficiency. Additionally, the results of the morphology-specific laboratory tasks suggest that while the core syntax of Spanish RHBs is intact, their morphological knowledge is variable. Specifically, RHBs may not have not developed meaning-to-form mappings for of all the morphemes tested in this study. In the remainder of this chapter I summarize the results of the study and compare the pattern that emerge to those that would be predicted by theories and hypotheses proposed to account for the linguistic outcomes of heritage bilingualism. I also align my interpretation of these results with those scholars who argue that the abilities of heritage bilinguals should be categorized as completely acquired but distinct language varieties. To conclude, I discuss the limitations of this study and avenues for future research, and close with some final thoughts on its implications for heritage language pedagogy and language maintenance.

5.2 Spanish RHB Knowledge of Morphological Well-formedness

In Section 3.3, I predicted that RHBs would be able to implicitly distinguish between grammatical and ungrammatical Spanish morphemes, and that their degree of sensitivity to well-formedness would be related to the order in which specific morphological structures are acquired in childhood. Morphemes that stabilize relatively late in childhood, and especially those that both convey more complex semantic information and stabilize after the onset of formal schooling, are particularly difficult to produce and interpret for even more proficient heritage bilinguals (Montrul, 2008, 2009). Because decreasing language proficiency has been shown to correlate with decreasing morphological competency in heritage bilinguals (Montrul, 2008; Montrul et al., 2008), it was not 13

This prediction was largely supported by both the accuracy rates and listening time data from the aural, self-paced GJT, described in section 4.5. Overall, listening times were slower for ungrammatical versus grammatical target phrases in all morpheme conditions except for aspect. This suggests that participants noticed most ungrammatical items and that they were a source of processing difficulty. Average accuracy was highest for subject/verb agreement morphemes, followed by gender, tense, aspect, and mood. Listening times were also longer for late- rather than early-acquired morphemes, suggesting that these structures were more difficult to parse, although the syllable length of the target phrases was not identical between morpheme conditions thereby disallowing valid statistical comparisons between them. However, listening time data did provide a more nuanced picture of the grammatical competence of RHBs than did the accuracy data. Specifically, no differences in accuracy were found between the aspect and mood conditions, both of which were just above chance (51%). However, listening times were longer

in the mood condition for ungrammatical versus grammatical items, but the same was not true for aspect condition. This suggests that participants were aware of the ungrammatical structures in the mood condition, although this awareness was not reflected by the accuracy scores for this condition. These results illustrate the way in which psycholinguistic techniques can reveal grammatical knowledge in low proficiency heritage populations that performance data may not be able to capture. Suggestions as to how future studies might use these techniques are provided later in Section 5.7.

While results of the GJT largely supported the predictions about the role that order of acquisition might play, one surprising result was that although gender emerges and stabilizes at approximately the same time in childhood as subject/verb agreement, participants were significantly less accurate and listening times were longer for items in the gender condition in comparison to the subject/verb agreement condition. Although difficulties producing and interpreting gender are known to persist beyond childhood in bilingual populations (Montrul et al., 2014), one possible explanation given for these results is that gender morphology is semantically more redundant (Harris, 1991) than is subject/verb agreement morphology, which may affect the degree to which gender agreement is acquired in childhood.

In summary, the results of the GJT suggest that on average, RHBs have underlying, implicit knowledge of the well-formedness of functional morphology in all conditions tested except for aspect. (Although it is important to note that the items in this task may not have provided enough context to reliably determine the grammaticality of items in the aspect condition). However, due to the nature of the task and the variability found in this population,

some RHBs may have more or less grammatical knowledge of the morphemes tested than is reflected by accuracy and listening times averaged across the group as a whole.

5.3 Spanish RHB Knowledge of Morphology and Semantic Contrasts

As described above, the results of the GJT provided information about which morphological structures form part of RHBs' underlying grammar. Next, a morpheme interpretation task tested whether RHBs could also interpret distinctions in meaning supplied by functional morphemes. Results of this task supported the prediction that RHBs do process morphology for meaning, and that their ability to do so diminishes in negative correlation with the age by which the given morpheme stabilizes in childhood. RHBs performed above chance in all morpheme conditions (chance in this task was 25%), and just like the results of the GJT, participants were most accurate in the subject/verb morphology condition and least accurate in the aspect condition. Once again, accuracy in the gender condition was lower than was expected, and in this task, accuracy in the gender condition actually trailed that of tense morphology. Upon closer inspection of the data, exceptionally low accuracy scores on gender items containing invariant nouns ending in "-a" is responsible for this result.

The morpheme comprehension task also tested how accurately participants could interpret meaning from morphemes and distinguish between morpheme contrasts in each condition. The results again were largely in line with the literature on the acquisition of semantic distinctions in childhood, although there were a few discrepancies. One discrepancy found in the gender condition is that subjects' accuracy was significantly lower for items in the masculine gender condition, and for items in which gender was assigned by the article versus gender

agreement on the adjective. Both these results are the opposite of what has generally been found in previous studies (Harris, 1991; McCarthy, 2008; Montrul et al., 2008). As was mentioned just above, one possible explanation is that this was due to the inclusion of invariant nouns ending in “-a” in the stimuli, which participants largely interpreted as feminine, even when the preceding article was masculine.

Another surprising result was that RHBs were also significantly more accurate in interpreting the meaning supplied by imperfect rather than preterit morphemes in the aspect condition, although the opposite would be expected. Acquisition of the imperfect develops later in childhood and evidence of less robust knowledge of imperfect morphology has been found in adult heritage bilinguals (Hodgson, 2005; Montrul, 2009). Recall from above that the GJT was not able to detect underlying knowledge of aspect morphology, although it is possible that this is was a result of the limited context provided by the test items themselves rather than a reflection of actual RHB knowledge. In comparison, the fact that RHBs performed above chance in the aspect condition on the morpheme comprehension task may be due to the greater deal of context provided by the mini stories in this task.

Similarly, RHBs performed above chance in the mood condition in the morpheme comprehension task (results were just over chance in the GJT), and participants were better able to interpret the meaning supplied by subjunctive rather than the indicative morphemes. Although the opposite has been found in previous studies (Montrul, 2007), it is possible that, as in the aspect condition, subjunctive morphology was preferred given the context provided by the test items. However, since the production of the specific mood distinction in adjectival clauses (in the case of this study, whether an antecedent was known to the subject or not) is infrequent in

heritage production (Silva-Corvalán, 1994b, Martínez-Mira, 2009), greater accuracy on these items may be due to other factors. Another possibility is that the way in which these test items were written may have led participants to prefer the interpretation of the stimuli that would require the subjunctive (that an antecedent was not known to the subject) regardless of the morpheme that actually appeared in the stimuli, resulting in higher accuracy rates for items containing subjunctive morphology.

In summary, the data for the morpheme comprehension task suggests that RHBs are able to interpret the meaning supplied by morphemes in all conditions, although their access to this meaning diminishes the later a morpheme is acquired. Also, they are reliably able to distinguish between most meaning contrasts in the different conditions. When these contrasts were analyzed specifically, the higher accuracy for some morphemes which emerge or are acquired comparatively later was surprising, although this is most likely due to issues related to the stimuli itself. As was mentioned for the GJT, accuracy rates varied considerably between individuals in the RHB group. This indicates that any given Spanish RHB may have knowledge of the semantic information supplied by morphemes that is greater or lesser than what the group averages suggest.

5.4 The Interrelatedness of Morphological Knowledge and Global Language Abilities

So far in this chapter I have reviewed the results of this study and what they reveal about Spanish RHBs' underlying knowledge of morphological well-formedness as well as their ability to accurately interpret the meaning that is supplied by morphemes. I now turn my attention to

correlations between the tasks and what they may reveal about the nature of Spanish RHBs' grammatical systems.

To determine whether linear relationships existed between the four different experimental tasks, a Pearson's correlation was calculated using a single representative score per participant and per task. As described in Section 4.7, significant correlations were found between all four experimental tasks, which was expected. However, the varying strengths with which listening comprehension abilities and proficiency are related to the results of the GJT and morpheme comprehension task may reveal characteristics of the grammatical abilities of Spanish RHBs that have not been shown so far by the study.

Recall from Section 4.7 that the ability of RHBs to understand spoken Spanish is most strongly correlated with their proficiency. This is not a surprising result, and previous studies have shown that the language abilities of heritage bilinguals vary by proficiency (Montrul, 2009; Montrul & Perpiñan, 2011). The comparative strengths of the correlations between proficiency scores and those for the other three experimental tasks are revelatory, however. More specifically, scores for the elicited imitation task (which evaluated proficiency) were most strongly correlated with the results of the morpheme comprehension task and were most weakly correlated with the results of the grammaticality judgment task. This is true despite the fact that accuracy scores overall were higher for the GJT than they were for the morpheme comprehension task. What this therefore suggests is that for RHBs there is a stronger relationship between proficiency and the ability to interpret morphemes for meaning, than there is between proficiency and underlying knowledge of grammatical well-formedness. Likewise, there is a stronger relationship between listening comprehension abilities and proficiency than there is

between listening comprehension and grammatical abilities. The interrelatedness of these three tasks seems to rest on the degree to which RHBs are able to access the semantic information provided by bound morphemes.

The patterns in these correlations support previous suggestions that the acquisition of heritage grammars in childhood, and particularly the acquisition of morphology, may be affected by vulnerabilities related to the syntax/semantic interface (Bolger & Zapata, 2011; Montrul, 2008, 2009). Although RHBs scored comparatively higher on the GJT than they did on the morpheme comprehension task, overall proficiency is most strongly correlated with the ability to interpret the semantic information provided by morphology. What this indicates is that while the core syntax of RHBs is in place, their knowledge of the semantics conveyed by morphology is variable. In the following section I discuss ways in which the grammars of Spanish HRBs might be described in light of these results.

5.5 The Characterization of RHB Language Abilities: Summary of findings for research question 6

The conceptualization of heritage language abilities has not always been described from an achievement perspective. Historically, the varieties of Spanish spoken by heritage bilinguals and the ways in which their language skills have been conceptualized have been described from a deficit viewpoint. Early descriptions of heritage bilinguals included loaded terms such as “semi-speaker” (Dorian, 1981), and the earliest teaching resources targeting heritage bilinguals viewed students as being in need of linguistic “remediation” (Valdés, 2005, p. 412).

Contemporary accounts of heritage language skills have relied heavily on the notion that heritage grammars are somehow “non-native”, or “incomplete” in comparison to monolingual varieties of

a language (Alarcón, 2011; Bolonyai, 2007; Jacobson, 2012; Montrul, 2002, 2008, 2009, 2011; Montrul & Bowles, 2009; Montrul et al., 2008; Polinsky, 2006, 2008; among others).

The profile of RHBs that emerges in this study in relation to their Spanish language skills is this: despite the position of Spanish as a minority language in relation to English in the US, despite limited and variable Spanish input during childhood, and despite having been formally educated entirely in English, RHBs are nevertheless able to understand the majority of the Spanish that they hear, and show a measureable degree of intact underlying syntactic structure, semantic knowledge, and listening comprehension abilities, and proficiency. These abilities attest to the resilience with which RHBs were able to acquire their heritage language in a context that differs greatly from that of L1 acquisition. I would therefore argue that the results of this study do not suggest that the grammars of Spanish RHBs have been incompletely acquired. To do so is to suggest that they learned their language in conditions that would support monolingual-like attainment, but their language development fell short for some reason. Recall from the discussion of the language histories of the Spanish RHBs given in Section 3.4.2, that these bilinguals were exposed to variable Spanish input from their caregivers during childhood, and that the participants spoke primarily English while growing up. In light of this, I suggest that these results provide evidence that Spanish RHBs did in fact completely acquire their heritage language in accordance with the input and language learning contexts in which they were raised.

A growing number of scholars are distancing themselves from the view of heritage grammars as incomplete, both in terminology and theoretical underpinnings²⁰ (Kupisch &

²⁰ It would be remiss of me to discuss the mounting efforts to reframe how heritage language abilities are viewed, without also mentioning the seminal researchers whose formidable work put this process in motion. I am certain that

Rothman, 2016; Martínez, 2009; Otheguy, 2013; Pascual y Cabo & Rothman, 2012; Putnam & Sanchez, 2013). Critiques of the notion of “incompleteness” highlight the fact that although inferred, there is no single, universal state of “completeness”, so therefore to suggest that the language skills of heritage bilinguals somehow fall short of a non-existent, arbitrary standard, is neither fair nor justifiable (Pascual y Cabo & Rothman, 2012). Another criticism leveled at the labels of “incomplete” and “non-native” in relation to how heritage languages are acquired, is that grammars are not simply downloaded from one generation to another (Otheguy, 2013). Rather, the input that heritage bilinguals receive is variable and itself affected by processes of language contact and change, which distinguish it from L1 varieties. It is therefore as untenable to label an acquired, heritage variety as “incomplete” in comparison to a monolingual variety, as it would be to label a monolingual variety as “deficient” because it lacks some characteristic of a heritage language grammar with which it was never in contact.

From a theoretical standpoint, hypotheses which have been put forth to account for incomplete acquisition in bilingual grammars have not been supported conclusively by the evidence. For example, the Regression Hypothesis (Jakobson, 1941), which originally emerged as an accounting of the phonological changes seen in children with aphasia, may be able to explain patterns of reversal in the development of a bilingual child’s verbal system when heritage language acquisition is tracked over time (Anderson, 1999a, 1999b, 2012; Silva-Corvalán, 2003, 2014). Recall from Chapter 2 that this hypothesis, which is rooted in the “cognitive nature of memory” (Köpke and Schmid 2004, p. 16), predicts that structures learned last will be lost first.

the understanding of Spanish heritage language bilingualism would not be what it is today, without the foundations laid by individuals such as Guadalupe Valdés and Carmen Silva-Corvalán.

However, when examining the language skills of adult heritage bilinguals, it is often not possible to determine what elements of the grammar might have been developed then lost in childhood and which structures never developed in the first place (Montrul, 2008). As it relates to the current study, the Regression Hypothesis might account for the patterns in the knowledge of morphology in the sense that the data support the prediction that “that which is learned last is lost first” (Köpke & Schmid 2004, p. 16). However, since this study does not include longitudinal data, it is impossible to know whether the end state of their grammars was affected by loss during childhood or not. Additionally, this hypothesis cannot explain the asymmetries between RHBs’ knowledge of morphological well-formedness and knowledge of the semantics supplied by morphemes, nor does it shed any light on the asymmetry between their receptive and productive skills generally.

At first glance, the activation threshold hypothesis might be able to explain the patterns in the data for this study. This hypothesis suggests that the activation of specific forms, rather than the chronology of their acquisition, is predictive of those forms that will be most robustly acquired and maintained (Köpke & Schmid 2004). As this hypothesis relates to heritage bilinguals, order of acquisition may be related to activation of certain forms. Child bilinguals would likely experience higher activation for those forms that stabilize earlier, as they would be exposed to them for a longer duration of time. Once they begin formal schooling at approximately the age of 5, the Spanish input they receive is reduced which also reduces the activation of morphemes that are in the process of being acquired. This would explain why knowledge of aspect and mood seems to be particularly affected. However, like the Regression Hypothesis, the activation threshold hypothesis does not account for differences in the

grammatical and semantic knowledge of morphemes in the Spanish RHB population, or the asymmetry between their receptive and productive skills.

Lastly, it has been noted that the development of certain structures in heritage grammars may be affected due by their degree of complexity; or more specifically due to the “interfaces” between areas of the grammar such as syntax and semantics may be particularly affected (Bolger & Zapata, 2011; Montrul, 2008, 2009, 2011). This may explain why RHBs show more robust knowledge of person/number verb agreement than they do of morphemes in the aspect and mood conditions. While person/number morphology has one form-to-meaning mapping, in the aspect and mood condition, one form can be mapped to several meanings (Montrul, 2008). That said, linguistic complexity has not been clearly conceptualized or operationalized, which limits its explanatory power. And as was noted for the previous two hypotheses described, whether some forms are more complex than others still does not explain the asymmetries found in the language skills of RHBs.

Alternate views that have been put forth to account for heritage grammars argue that rather than falling short of some target standard, heritage grammars are simply different varieties that are perfectly acquired in accordance with the input received and the language environment in which heritage bilinguals were raised (Kupisch & Rothman, 2016; Pascual y Cabo & Rothman, 2012; Putnam & Sanchez, 2013). Putnam and Sanchez (2013) propose a theoretical model that reframes the way in which heritage grammars are viewed which addresses the problems inherent in making direct comparisons between monolingual and heritage language varieties. In this model, the authors suggest that the state of a given heritage bilinguals’ grammar is a result of L1 functional features in the heritage language which have undergone re-assembly

due to the frequency and type of input the heritage bilingual receives in the L1 and L2. The linguistic abilities of heritage bilinguals are therefore viewed as new, but complete systems whose characteristics are dependent upon patterns of language input and activation, and bilingual grammars are understood to exist at various stages on a sliding spectrum. Heritage language abilities that correspond to the last stage of their model are characterized by difficulty in activating phonological and semantic features in production and comprehension.

The results of this study provide evidence of this model's predictive power in relation to receptive bilingual grammars. Specifically, as this model would predict, despite receiving limited and variable input during childhood, RHBs are not lacking intact, underlying syntactic, structure. The results rather suggest that RHBs have not learned to map all the morphological forms to the meaning that they convey, and that the degree to which meaning has been mapped to morphology may be predictive of how proficient they are and how well they understand spoken Spanish. In relation to how the language skills of Spanish RHBs should be described, crucially, this model does not point to differences between heritage languages and monolingual varieties as evidence that heritage grammars are somehow "incomplete". Similarly, Cabo et al.'s suggestion that the missing surface inflection hypothesis might account for morphological production/perception asymmetries between perceptive and productive skills of L2 learners, may also be applicable to the results of this study (2012). Specifically, these asymmetries are not considered deficiencies in the language, but rather emerge as a result of underlying forms not being mapped to nominal and verbal inflection in production. In the same way, the missing surface inflection hypothesis may account for the fact that Spanish RHBs have greater access to the rules governing morphological well-formedness than they do to the meaning provided by

those morphemes. It is possible that the semantic information provided by these functional morphemes has not been mapped to their underlying forms.

Importantly, these models reframe heritage grammars as a variety that has been completely acquired in its own right, and whose specific characteristics stem from patterns of language input and activation over a lifetime. While the shift away from the notion of “incompleteness” in describing and modeling heritage languages grammars may at first glance seem to some like a semantic technicality, in this section I have used the data in this study as well as the compelling arguments made by other scholars in the field, to argue that viewing heritage grammars as incomplete is both logically and theoretically unsound. Rather than describing heritage grammars as having failed to achieve an arbitrary target/monolingual state, future attempts to account for patterns in their knowledge should examine the ways in which bilingual grammars develop in accordance with specific input received in childhood. It also bears reminding that great strides have been made in eliminating the “grossly insensitive” and “antagonistic” (Martínez, 2003) rhetoric which was prominent early on in the field of Spanish heritage language pedagogy. However, the continued categorization of bilingual grammars as incomplete, however well-intended, tacitly reproduces language hierarchies that have historically been used to devalue and stigmatize heritage languages and speakers. Linguistic insecurity is well-documented in studies of the affective needs of heritage bilinguals (Leeman, 2015; Potowski & Carreira, 2010; Web & Miller, 2000), and Spanish heritage bilinguals have often internalized messages about their heritage language’s inferiority or undesirability (Potowski & Carreira, 2010; Leeman, 2015). It is true that “incomplete acquisition” has become firmly entrenched in the literature, and referring to related studies without invoking that particular

phrase can be a challenge. However, the continued use of terminology that sustains the notion that heritage grammars are subordinate to other language varieties should be carefully weighed against the ethical implications of doing so.

5.6 Limitations of the Study

While this research provides important insights into the language abilities of Spanish RHBs in regard to the nature of their grammatical competence and morphological knowledge, this study is not without limitations.

For example, although Spanish RHBs were carefully screened to ensure that they fit the language profile of receptive bilinguals, the considerable variability in the results of the different experimental tasks suggests that the study might have benefited from subcategorizing the subjects by proficiency. Although the number of participants was not sufficient to have analyzed the data by proficiency level as this study currently stands, in the future, similar studies might recruit larger numbers of participants in order to examine how proficiency levels correlate with specific grammatical knowledge.

Another limitation is that the primary instrument used to evaluate the listening comprehension abilities of RHBs was developed for L2 learners, and not heritage bilinguals. As a result, it was designed to evaluate knowledge of language that is typically learned according to an L2 acquisitional timeline. As such, it is possible that a different task might reveal more robust patterns of comprehension. Possible alternatives might include a story re-telling task, in which participants are presented with a story in Spanish, then are asked to re-tell it in English.

A final limitation of this study is related to the psycholinguistic techniques used in the GJT. More specifically, while it is possible to infer processing difficulty from self-paced listening data, the results do not provide conclusive or fine-tuned information about the specific nature or source of the processing difficulty. By using technology such event related potential (ERP) measurements to re-test the GJT, it would be possible to more precisely pinpoint the source and/or the type of processing difficulty that participants experience. For example, in a study using ERP technology, stimuli that elicits an N400 effect suggests a semantic or pragmatic anomaly while a P600 effect would result from the processing of a syntactic error. Future studies would benefit from inclusion of these more advanced and informative experimental techniques, particularly in studies of receptive bilinguals whose language skills are limited to the aural domain .

5.7 Avenues for Future Research

Little is known about the relationship between the receptive and productive grammars of Spanish RHBs (Valdés, 2005, 2012). An important avenue for future research is therefore an examination of the factors that contribute to the asymmetry between their receptive and productive skills. More specifically, although RHB speech is limited, a comparison of the structures they are able to produce versus those they can comprehend might shed light on the ways in which access to linguistic knowledge may vary for comprehension versus production.

Another line of investigation related to RHBs is whether it is possible to quantify the factors that would have affected the nature of the input that participants received. In this way it might be possible to disentangle the different variables in the home environment which affect

language acquisition, and to predict what language skills a RHB might have based on their language history profile. This could potentially facilitate a better understanding of the variability found in the RHB group.

5.8 Final Thoughts and Implications for Pedagogy and Language Maintenance

In closing, this study sought to evaluate the underlying grammatical competence and morphological abilities of a population of Spanish RHBs who often anecdotally state, “I understand everything you say, I just don’t speak it”. The results revealed that despite limited production and literacy skills, these bilinguals do indeed understand the majority of what they hear in Spanish and do have underlying knowledge of grammatical structure and of the semantic meaning provided by morphology. Despite the variability in this population and the fact that morphological knowledge decreases as the age at which a morpheme stabilizes in childhood increases, the results nevertheless revealed that RHBs have intact syntactic structure and overall proficiency and aural comprehension abilities vary in accordance with the extent to which RHBs can interpret the semantics of morphology.

The results of this study have implications for pedagogical practices and language maintenance and revitalization efforts in the US. In relation to the former, these results suggest that RHBs may benefit from teaching methodologies that would support the mapping of meaning various to morphological forms. In relation to the latter, RHBs, who are “at the verge of culminating the language shift towards English monolingualism” (Beaudrie, 2009a, p. 86) may be the last in their family to have competence that allows them to function in the language. As such, their linguistic abilities should not be discounted, and their specific language abilities and

profiles warrant the creation of courses designed to address their needs and strengths (Beaudrie & Ducar, 2005). I hope that the results of this study support the view that the language abilities of RHBs constitute a particular type of bilingualism that should be investigated in its own right, and should supported in the classroom with teaching methodologies that are informed by an understanding of the linguistic and affective needs of these bilinguals.

APPENDIX A – MASS SURVEY FOR RECRUITMENT

Title of Project: Spanish Language Processing by Receptive Bilinguals

You are being invited to voluntarily complete questions on the next 2 pages that may make you eligible to participate in a study that would measure your understanding of spoken Spanish, with the purpose of determining how language history affects understanding. You are under no obligation to participate in that study if invited. You can obtain further information from the principal investigator, Bonnie Holmes, at (814) 360-3893.

Language History

Name: _____

Email Address: _____

May we email you about participating in our study? Y / N

Age: _____ Gender: F / M Place of Birth: _____

Parents' place of Birth _____

1. Please list all languages you know, regardless of how well you know them:

2. Did you **hear** Spanish while you were growing up? YES / NO

If yes, where? _____ From whom? _____ How often?

3. Did you **speak** Spanish while you were growing up? YES / NO

If yes, where? _____ From whom? _____ How often?

4. Did you **hear** English while you were growing up? YES / NO

If yes, where? _____ From whom? _____ How often?

5. Did you **speak** English while you were growing up? YES / NO

If yes, where? _____ From whom? _____ How often?

6. What language do you consider to be your native language? English / Spanish / Other

If other, please list below:

7. What language do you consider to be your dominant language? English / Spanish / Other

If other, please list below:

8. Currently, how would you rate your **spoken** Spanish skills?

Native / Advanced / Intermediate / Beginning / I don't currently use Spanish

9. Currently, how much do you **understand** when you hear spoken Spanish?

Everything / Almost everything / The general idea / Some random words / Nothing

10. Currently, what percentage of the time do you:

Speak English _____

Speak Spanish: _____

Hear English: _____

Hear Spanish: _____

11. Have you attended a school that taught in:

English: YES / NO

If yes, at what age?:

Spanish: YES / NO

If yes, at what age?

10. Have you received any formal instruction in a second or foreign language (e.g., English, Spanish, etc.)?

If yes, in what languages? _____ For approximately how many years?

At what age/ages did you begin? _____

12. Are you currently taking any language courses? (e.g., SPAN 101) YES / NO

If so, what class are you taking? _____ If Spanish, is this your first Spanish course at the UA? Y / N

13. Have you had any “immersion” experiences? That is, have you lived some place where you had to communicate in another language? YES / NO

If you answered “yes”, which country/countries? _____

For how long? _____

APPENDIX B – ORAL PRODUCTION TASK



APPENDIX C – CONSENT FORM

The University of Arizona Consent to Participate in Research

Study Title: Spanish Language Processing by Heritage Bilinguals

Principal Investigator: Bonnie C. Holmes, M.A., Ph.D. (ABD)

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to participate.

Why is this study being done?

The purpose of this study is to determine how different language learning backgrounds during childhood affect the processing of Spanish in adulthood.

What will happen if I take part in this study?

The procedures you will be asked to perform are described below. You will complete a total of 6 experimental tasks.

Experimental session 1 (From home):

- You will complete a language history questionnaire (task 1)

Experimental session 2 (tasks 2-6)

- You will be taken into the next room and seated in front of a computer monitor.
- You will be instructed about what you need to do during the following 5 tasks (task 2 - 6):
 - Task 2: You will listen to and repeat a series of sentences in Spanish that increase in length. Your responses will be audio recorded
 - Task 3: You will listen to a series of contextualized, videotaped conversations in Spanish. You will answer questions about them using the computer keyboard
 - Task 4: You will listen to a series of sentences in Spanish, and will answer questions about them using the keyboard.
 - Task 5: You will listen to a series of short stories in Spanish, and will answer questions about them using a keyboard.
 - Task 6: You will look at pictures of a familiar fairytale, and will describe the story to the best of your ability in Spanish. Your responses will be audio recorded.
- You will be debriefed about the experiment and any questions you have will be answered.
- The researcher may contact you via email if necessary for follow up.

How long will I be in the study?

Your participation in this study will last up to 1.5 hours. The first 30 minutes will take place in your home (you will answer a computerized biographical questionnaire). The next hour will take place in the lab located in Communications 314.

How many people will take part in this study?

120 participants will take part in this study. In order to participate in this study, you must have grown up in a family or community where you heard Spanish, and you must currently understand spoken Spanish.

Can I stop being in the study?

Your participation is voluntary. You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The University of Arizona. If you are a student or employee at the University of Arizona, your decision will not affect your grades or employment status.

What risks, side effects or discomforts can I expect from being in the study?

The things that you will be doing have no more risk than you would come across in everyday life. However, if at any point you feel uncomfortable and do not wish to continue, you are free to stop your participation. Your data will be assigned an anonymous participant code, and will be stored in a secure file cabinet in GIDP-SLAT Office, Modern Languages, 549C for six years. Once six years have passed, it will be destroyed.

What benefits can I expect from being in the study?

You will not receive any personal benefit from taking part in this study. More generally, what we learn about language processing may have implications for how Spanish for heritage learners is taught. Participants recruited from Spanish 103 courses may receive \$15 compensation or extra credit. Participants recruited from INDIV 101 will receive course credit in accordance with course policies.

What other choices do I have if I do not take part in the study?

You may choose not to participate without penalty or loss of benefits to which you are otherwise entitled.

Will my study-related information be kept confidential?

Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law.

Also, your records may be reviewed by the following groups:

- Office for Human Research Protections or other federal, state, or international regulatory agencies

- The University of Arizona Institutional Review Board

Who can answer my questions about the study?

For questions, concerns, or complaints about the study you may contact Bonnie Holmes (holmesbc@email.arizona.edu, 814.360.3893)

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the Human Subjects Protection Program at 520-626-6721 or online at <http://ocr.arizona.edu/hspp>.

If you are injured as a result of participating in this study or for questions about a study-related injury, you may contact Bonnie Holmes (holmesbc@email.arizona.edu, 814.360.3893)

An Institutional Review Board responsible for human subjects research at The University of Arizona reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Signing the consent form

I have read (or someone has read to me) this form, and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

I agree that my oral responses for experimental tasks 4 and 6 as described above may be audio recorded: Yes No

Printed name of subject

Signature of subject

Date and time **AM/PM**

APPENDIX D – ELICITED IMITATION TASK

1. Quiero cortarme el pelo (7)
2. El libro está en la mesa (7)
3. El carro lo tiene Pedro (8)
4. Él se ducha cada mañana (9)
5. ¿Qué dice usted que va a hacer hoy? (9)
6. Dudo que sepa manejar muy bien (10)
7. Las calles de esta ciudad son muy anchas (11)
8. Puede que llueva mañana todo el día (12)
9. Las casas son muy bonitas pero caras (12)
10. Me gustan las películas que acaban bien (12)
12. El chico con el que yo salgo es español (13)
11. Después de cenar me fui a dormir tranquilo (13)
13. Quiero una casa en la que vivan mis animales (14)
14. A Uds. les fascinan las fiestas grandiosas (14)
15. Ella sólo bebe cerveza y no come nada (15)
16. Me gustaría que el precio de las casas bajara (15)
17. Cruza a la derecha y después sigue todo recto (15)
18. Ella ha terminado de pintar su apartamento (14/15)
19. Me gustaría que empezara a hacer más calor pronto (15)
20. El niño al que se le murió el gato está triste (16)
21. Una amiga mía cuida a los niños de mi vecino (16)

22. El gato que era negro fue perseguido por el perro (16)
23. Antes de poder salir él tiene que limpiar su cuarto (16)
24. La cantidad de personas que fuman ha disminuido (17)
25. Después de llegar a casa del trabajo tomé la cena (17)
26. El ladrón al que atrapó la policía era famoso (17)
27. Le pedí a un amigo que me ayudara con la tarea (17)
28. El examen no fue tan difícil como me habían dicho (17)
29. ¿Serías tan amable de darme el libro que está en la mesa? (17)
30. Hay mucha gente que no toma nada para el desayuno (17)

APPENDIX E – ELICITED IMITATION RATING CRITERIA

Table 1.0 EIT score 0 descriptor (taken from Ortega et al., in preparation)

Criteria	Examples
<ul style="list-style-type: none"> • Nothing (Silence) 	
<ul style="list-style-type: none"> • Garbled (unintelligible, usually transcribed as XXX) 	
<ul style="list-style-type: none"> • Minimal repetition, then item abandoned: <ul style="list-style-type: none"> - Only 1 word repeated - Only 1 content word plus function word(s) - Only function word(s) repeated - Only 1 or 2 content words out of order plus extraneous words that weren't in the original stimulus 	<ul style="list-style-type: none"> - Manana (10- item 4) - El examen que [gibberish] (09- item 28) - Despues mue- XX tranquilo (01-item 11) - Tu que sepa a- m- muy bien (12-item 6) - Me gustaria las se se se el XXX (16-item 18)

Table 1.1 EIT score 1 descriptor (taken from Ortega et al., in preparation)

Criteria	Examples
<ul style="list-style-type: none"> • When only about half of idea units are represented in the string but a lot of important information in the original stimulus is left out; sometimes the resulting meaning is unrelated (or opposed) to stimulus 	<ul style="list-style-type: none"> -Antes de poder seguir (3 sec.) perdio su cuarto (02-item 23) -Dudo que sepa ma- tambien (04-item 6) -Seria en que el libro esta en la mesa (11-item 29) -El gato que eran pelo negro dan something el perro (14-item 22)
<ul style="list-style-type: none"> • Or when string doesn't in itself constitute a self-standing sentence with some (related or not to stimulus) meaning (This may happen when only 2 of 3 content words are repeated and no grammatical relation between them is attempted) 	<ul style="list-style-type: none"> -El ladron que XX la policia famoso (11-item 26) -Despues de cenar fue en- tranquilo (03-item 11) -Le pendu una amiga que XXX la tarea (01-item 27) -La cantidad de personas fumar alguno, alguno (03-item 24)

Table 1.2 EIT score 2 descriptor (taken from Ortega et al., in preparation)

Criteria	Examples
<ul style="list-style-type: none"> When content of string preserves at least more than half of the idea units in the original stimulus; string is meaningful, and the meaning is close or related to original, but it departs from it in some slight changes in content, which makes content inexact, incomplete, or ambiguous 	<ul style="list-style-type: none"> -Despues de cenar me fui a X tranquilo (11-item 12) -Ella sola cerveza y no come nada (05-item 17) -Quieres una casa que viven los alemanes an- animales (07-item 13) -El chico con lo que es algo es espanol (08-item 12) -El chico con yo salgo es muy bien (15-item 12) -Despues a trabajo tome la cena (16-item 25)

Table 1.3 EIT score 3 descriptor (taken from Ortega et al., in preparation)

Criteria	Examples
<ul style="list-style-type: none"> Original, complete meaning is preserved as in the stimulus. Strings which are ungrammatical can get a 3 score, as long as exact meaning is preserved. Some synonymous substitutions are acceptable: -Anything with or without ‘muy’ (very) should be considered synonymous. -Substitutions of ‘y’/‘pero’ (and & but) are acceptable. Changes in grammar that don’t affect meaning should be scored as 3. (Ambiguous changes in grammar that could be interpreted as meaning changes from a NS perspective should be scored as 2. That is, as a general principle in case of doubt about whether meaning has changed or not, score 2.) 	<ul style="list-style-type: none"> -Me gustaria el precio de las casas baraja (2 sec.) baja (15-item 18) -El nino que se m- murio cato esta triste (02-item 16) -[gibberish] se ducha cada manana (18-item 4) -Quiero cortar mi pelo (05-item 1) -Las calles de esta ciudad son anchas (13-item 7) -El chico que yo salgo es espanol (06-item 11) -El chico con el salgo es espanol (05-item 11) -El examen no fuen tan difcil come han di- como me han dicho (12-item 28) -Las casa son muy bonitas pero caras (07-item 9) -Quiero una casa en que viven mis animales (12-item 13) -Dudo que saba a ma- manejar muy bien (11-item 6) -Ella he terminado X pintar sus apartamento (11-item 15)

Table 1.4 EIT score 4 descriptor (taken from Ortega et al., in preparation)

Criteria	Examples
<ul style="list-style-type: none"> Exact repetition: String matches stimulus exactly. Both form and meaning are correct without exception or doubt. 	

APPENDIX F – AURAL, SELF-PACED GRAMMATICALITY JUDGMENT TASK

Condition			
Practice item	Los niños	juegan al fútbol	en el parque
Practice item	Mi madre	está	en la cocina
Practice item	Mi hermano	camina	con sus amigos
Practice item	Las clases	empezamos	a las 8:00
Gender	Se vende	la casa bonita	en la esquina
Gender	En la mañana	el perro chiquito	come mucho
Gender	Se vende	la casa *bonito	en la esquina
Gender	En la mañana	el perro *chiquita	come mucho
Gender	Ellos estudian	la historia	de México
Gender	Dicen que	el vecino	está afuera
Gender	Ellos estudian	*el historia	de México
Gender	Dicen que	*la vecino	está afuera
Gender	Esta mañana	voy a hacer	la cama pequeña
Gender	El niño	limpia bien	el cuarto pequeño
Gender	Esta mañana	voy a hacer	la cama *pequeño
Gender	El niño	limpia bien	el cuarto *pequeña
Gender	En la noche	mi papá cierra	la puerta
Gender	Anoche	se quebró	el teléfono
Gender	En la noche	mi papá cierra	*el puerta
Gender	Anoche	se quebró	*la teléfono
Subject/Verb agreement	Mis tíos	comen	en el restaurante

Subject/Verb agreement	Juan	estudia	el lunes
Subject/Verb agreement	Tú	hablas	por teléfono
Subject/Verb agreement	Yo	quiero	una manzana
Subject/Verb agreement	Mis tíos	*como	en el restaurante
Subject/Verb agreement	Juan	*estudian	el lunes
Subject/Verb agreement	Tú	*hablan	por teléfono
Subject/Verb agreement	Yo	*quiere	una manzana
Subject/Verb agreement	Los sábados	nosotros	queremos dormir
Subject/Verb agreement	En el trabajo	yo	hablo mucho
Subject/Verb agreement	Los domingos	mi mamá	limpia la casa
Subject/Verb agreement	En Navidad	tú	bailas mucho
Subject/Verb agreement	Los sábados	nosotros	*quieren dormir
Subject/Verb agreement	En el trabajo	yo	*hablas mucho
Subject/Verb agreement	Los domingos	mi mamá	*limpian la casa
Subject/Verb agreement	En Navidad	tú	*bailan mucho
Present vs Preterite	Ahora mismo	mi abuela cocina	con la familia
Present vs Preterite	En este momento	mi amigo viene	a mi casa
Present vs Preterite	El año pasado	mi sobrino nació	en Hermosillo
Present vs Preterite	La semana pasada	yo fui	a Tucson
Present vs Preterite	Ahora mismo	mi abuela *cocinó	con la familia
Present vs Preterite	En este momento	mi amigo *vino	a mi casa
Present vs Preterite	El año pasado	mi sobrino *nace	en Hermosillo
Present vs Preterite	La semana pasada	yo *voy	a Tucson

Present vs Preterite	Ahora mismo	los alumnos	caminan a la escuela
Present vs Preterite	Mañana	en la tarde	tengo un examen
Present vs Preterite	La semana pasada	un amigo	compró un carro nuevo
Present vs Preterite	El mes pasado	durante las vacaciones	fuimos a la playa
Present vs Preterite	Ahora mismo	los alumnos	*caminaron a la escuela
Present vs Preterite	Mañana	en la tarde	*tuve un examen
Present vs Preterite	La semana pasada	un amigo	*compra un carro nuevo
Present vs Preterite	El mes pasado	durante las vacaciones	*vamos a la playa
Preterite vs Imperfect	Mis hermanos	nacieron	en San Diego
Preterite vs Imperfect	Mi tío	pasó 10 años	en Hermosillo
Preterite vs Imperfect	Nosotros	teníamos tres años	cuando venimos a Tucson
Preterite vs Imperfect	Tu me dijiste	que estabas enfermo	la semana pasada
Preterite vs Imperfect	Mis hermanos	*nacían	en San Diego
Preterite vs Imperfect	Mi tío	*pasaba 10 años	en Hermosillo
Preterite vs Imperfect	Nosotros	*tuvimos tres años que *estuviste enfermo	cuando venimos a Tucson
Preterite vs Imperfect	Tu me dijiste	enfermo	la semana pasada
Preterite vs Imperfect	De niños	mis padres	se criaron en Mexico
Preterite vs Imperfect	El verano pasado	mi amigo Javier	terminó 5 libros
Preterite vs Imperfect	Esta tarde	cuando salimos	era la una y media
Preterite vs Imperfect	Cada año	en mi cumpleaños	yo bailaba mucho
Preterite vs Imperfect	De niños	mis padres	se *criaban en Mexico
Preterite vs Imperfect	El verano pasado	mi amigo Javier	*terminaba 5 libros
Preterite vs Imperfect	Esta tarde	cuando salimos	*fue la una y media

Preterite vs Imperfect	Cada año	en mi cumpleaños	yo *bailé mucho
Indicat vs subj	Es cierto	que la tienda queda	muy lejos
Indicat vs subj	Nosotros pensamos	que la clase empieza	a las 9:00
Indicat vs subj	Magda quiere	que su hijo vaya	a la iglesia
Indicat vs subj	Yo espero	que mis amigos lleguen	a tiempo
Indicat vs subj	Es cierto	que la tienda *quede	muy lejos
Indicat vs subj	Nosotros pensamos	que la clase *empiece	a las 9:00
Indicat vs subj	Magda quiere	que su hijo *va	a la iglesia
Indicat vs subj	Yo espero	que mis amigos *llegan	a tiempo
Indicat vs subj	En la tienda	es cierto que	el libro cuesta mucho
Indicat vs subj	Por la tarde	es verdad que	dormimos a veces
Indicat vs subj	Los doctores	sugieren que	la gente coma fruta
Indicat vs subj	Las niñas	prefieren que	la comida sea buena
Indicat vs subj	En la tienda	es cierto que	el libro *cueste mucho
Indicat vs subj	Por la tarde	es verdad que	*durmamos a veces
Indicat vs subj	Los doctores	sugieren que	la gente *come fruta
Indicat vs subj	Las niñas	prefieren que	la comida *es buena
Distractor	A mí	me gustan las playas	de California
Distractor	A él	le gustan los libros	de ficción
Distractor	A ti	te gustan los tamales	en Navidad
Distractor	A nosotros	nos gustan los viajes	a Argentina

Distractor	Yo	gusto las playas	de California
Distractor	El	gusta los libros	de ficción
Distractor	Tú	gustas los tamales	en Navidad
Distractor	Nosotros	gustamos los viajes	a Argentina
Distractor	En la mañana	a ellos	les gustan los huevos
Distractor	En la universidad	a nosotros	nos gustan los profesores
Distractor	En el restaurante	a ella	le gustan las tortillas
Distractor	Este semestre	a mí	me gustan las clases
Distractor	En la mañana	ellos	gustan los huevos
Distractor	En la universidad	nosotros	gustamos los profesores
Distractor	En el restaurante	ella	gusta las tortillas
Distractor	Este semestre	yo	gusto las clases

APPENDIX G – BIOGRAPHICAL QUESTIONNAIRE

Bilingual background questionnaire for Spanish/English speakers

Welcome! In this survey, you will answer a series questions about your Spanish and English language use from childhood until now. You will advance through 8 short sections, and it will take you approximately 20 minutes. Try to answer the questions as accurately as you can.

A. Personal Data

1. Name _____

2. Age _____

3 Telephone number (Only to be used in the case the investigator needs to contact you to follow up.) _____

4. Email address _____

5. What is your highest level of education currently completed?

- High school graduate
- Some college
- College graduate
- Graduate school

6. Where were you born? (City, State, Country) Ex: Tucson, AZ, USA _____

7. Where do you currently live? (City, State, Country) Ex: Tucson, AZ, USA

8. If you were not born in the US, during what ages did you live in your country of origin? _____

9. If you were not born in the US, how long have you lived in the US? (number of years) _____

B. Family History

10. Where were your parents/caregivers born? (Indicate the city, state and country)

Mother _____

Father _____

Other (specify person: babysitter, nanny, other family member, etc.) _____

11. Did your parents or grandparents move to the US from another country? If so, from where? (check all that apply) (Remember that survey information is confidential, and is only used to establish a language background history.)

Mother (from where) _____

Father (from where) _____

Maternal grandmother (from where) _____

Maternal grandfather (from where) _____

Paternal grandmother (from where) _____

Paternal grandfather (from where) _____

12. Where do your parents and grandparents currently live? (indicate city, state and country, or N/A)

Mother _____

Father _____

Maternal grandmother _____

Maternal grandfather _____

Paternal grandmother _____

Paternal grandfather _____

13. What are your parents'/caregivers' native languages? (check all that apply)

	Spanish	English	Other
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify person: babysitter, nanny, other family member, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Do your parents/caregivers speak any languages other than Spanish or English? (check all that apply)

Mother (specify language) _____

Father (specify language) _____

Other (babysitter, nanny, other family member - specify language) _____

15. What is your parents'/caregivers' highest level of schooling? Choose one answer for each.

	Elementary/Middle school	High school	College	Graduate school	Not sure
Mother					
Father	<input type="checkbox"/>				
Other (specify person: babysitter, nanny, other family member, etc.)	<input type="checkbox"/>				

C. Childhood Language History

16. At what age were you first exposed to English?

- Birth (1)
- 1-2 years (2)
- 3-4 years (3)
- 5+ years (specify age) (4) _____

17. At what age were you first exposed to Spanish?

- Birth (1)
- 1-2 years (2)
- 3-4 years (3)
- 5+ years (specify age) (4) _____

18. Did you begin to speak both Spanish and English before age 5?

- Yes (1)
- No (2)

19. What languages did you hear in your home between the ages of birth - 5 years? (choose all that apply)

- Spanish (1)
- English (2)
- Both Spanish and English (3)
- Other (specify) (4) _____

20. What languages did your parents/caregivers use mostly when speaking to you? when you were growing up? (check all that apply)

	Spanish	English	Both Spanish and English	Other
Mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify person: babysitter, nanny, other family member, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. What languages did you use mostly when speaking to your parents/caregivers when you were growing up? (check all that apply)

	Spanish	English	Both Spanish and English	Other
With your mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With your father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With another caregiver (specify person: babysitter, nanny, other family member, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Do you have any siblings?

- Yes
 No

23. How many siblings do you have? _____

24. Are they older or younger?

- Older
 Younger
 I have both older and younger siblings

25. What languages did you use when speaking with your siblings growing up? (check all that apply)

- Spanish
 English
 Both Spanish and English
 Other (specify) language (5) _____

26. Did grandparents live at home when you were growing up?

- Yes
- No

27. What languages did your grandparents use when speaking to you when you were growing up? (check all that apply)

- Spanish
- English
- Both Spanish and English
- Other (specify language) _____

28. What languages did you use when speaking with your grandparents when you were growing up? (check all that apply)

- Spanish
- English
- Both Spanish and English
- Other (specify language) _____

D. Elementary School Language History

29. Did you attend elementary school in the US?

- Yes
- No

30. Was English the primary language of instruction?

- Yes
- No

31. Did you have Spanish as a foreign/second language in elementary school?

- Yes
- No

32. How many hours a week of Spanish did you have in elementary school?

- 2 hours
- 5 hours
- 10 hours
- More than 10 hours

E. Current Self-assessed Language Proficiency

33. Rate your current overall language ability in ENGLISH:

- 1 = understand but cannot speak
- 2 = understand and can speak with great difficulty
- 3 = understand and speak but with some difficulty
- 4 = understand and speak comfortably, with little difficulty
- 5 = understand and speak fluently like a native speaker

34. Rate your current overall language ability in SPANISH:

- 1 = understand but cannot speak
- 2 = understand and can speak with great difficulty
- 3 = understand and speak but with some difficulty
- 4 = understand and speak comfortably, with little difficulty
- 5 = understand and speak fluently like a native speaker

35. On a scale of 1-5, rate your abilities in ENGLISH:

	Poor	Needs work	Good	Very good	Native speaker command
Reading	<input type="checkbox"/>				
Speaking	<input type="checkbox"/>				
Listening	<input type="checkbox"/>				
Writing	<input type="checkbox"/>				

36. How comfortable are you hearing and speaking ENGLISH?

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Hearing English	<input type="checkbox"/>				
Speaking English	<input type="checkbox"/>				

37. On a scale of 1-5, rate your abilities in SPANISH:

	1 = Poor	2 = Needs work	3 = Good	4 = Very good	5 = Native speaker command
Reading	<input type="checkbox"/>				
Speaking	<input type="checkbox"/>				
Listening	<input type="checkbox"/>				
Writing	<input type="checkbox"/>				

38. How comfortable are you hearing and speaking SPANISH?

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable
Hearing Spanish	<input type="checkbox"/>				
Speaking Spanish	<input type="checkbox"/>				

APPENDIX H – MORPHEME COMPREHENSION TASK

Cond	Mini story	Comprehension question
Practice	La muchacha juega con la pelota cada tarde.	<p>According to the sentence, who plays with the ball?</p> <p>A. A girl B. A boy C. Both a boy and girl D. It's not clear from the sentence</p>
Practice	Mis amigos fueron a un concierto.	<p>According to the sentence, when did my friends go to the concert?</p> <p>A. It's not clear from the sentence B. They went in the past C. They will go in the future D. They regularly go to concerts</p>
Gender	Carlos habla con Marta antes de clase. Siempre esta muy cansado despues de clase.	<p>According to the sentence, who is very tired after class?</p> <p>A. It's not clear from the sentence B. Marta C. Carlos D. Both of them</p>
Gender	Carlos habla con Marta antes de clase. Siempre está muy cansada después de clase.	<p>According to the sentence, who is very tired after class?</p> <p>A. Carlos B. Marta C. Both of them D. It's not clear from the sentence</p>
Gender	Javier camina con su amiga Linda en el parque. Es muy simpático.	<p>According to the sentence, who is very nice?</p> <p>A. It's not clear from the sentence B. Linda C. Both of them D. Javier</p>
Gender	Javier camina con su amiga Linda en el parque. Es muy simpática.	<p>According to the sentence, who is very nice?</p> <p>A. Linda B. Javier C. Both of them D. It's not clear from the sentence</p>

- Gender Ramiro está hablando con su jefa. Está muy enojado. According to the sentence, who is very angry?
A. His boss
B. Both of them
C. Ramiro
D. It's not clear from the sentence
- Gender Ramiro está hablando con su jefa. Está muy enojada. According to the sentence, who is very angry?
A. Ramiro
B. His boss
C. Both of them
D. It's not clear from the sentence
- Gender La mujer se tomó una foto con su novio. Salió muy alto en la foto. According to the sentence, who looked tall in the photo?
A. The woman
B. Both of them
C. Her boyfriend
D. It's not clear from the sentence
- Gender La mujer se tomó una foto con su novio. Salió muy alta en la foto. According to the sentence, who looked tall in the photo?
A. Both of them
B. The woman
C. Her boyfriend
D. It's not clear from the sentence
- Gender La niña corre junto a su perro en el parque. Es muy rápido. According to the sentence, who is very fast?
A. The girl
B. Both of them
C. It's not clear from the sentence
D. The dog
- Gender La niña corre junto a su perro en el parque. Es muy rápida. According to the sentence, who is very fast?
A. The girl
B. It's not clear from the sentence
C. The dog
D. Both of them

Gender	Angela está estudiando con Marcos para la prueba. Está muy preocupado.	According to the sentence, who is very worried? A. Both of them B. It's not clear from the sentence C. Angela D. Marcos
Gender	Angela está estudiando con Marcos para la prueba. Está muy preocupada.	According to the sentence, who is very worried? A. Angela B. Marcos C. Both of them D. It's not clear from the sentence
Gender	En el centro de la ciudad, el artista está pintando un mural.	According to the sentence, who is painting a mural? A. Both a male and female artist B. A female artist C. A male artist D. It's not clear from the sentence
Gender	En el centro de la ciudad, la artista está pintando un mural.	According to the sentence, who is painting a mural? A. It's not clear from the sentence B. A female artist C. A male artist D. Both a male and female artist
Gender	Durante la noche, el poeta escribió una carta a su amor.	According to the sentence, who wrote the love letter? A. Both a male and female poet B. A female poet C. It's not clear from the sentence D. A male poet
Gender	Durante la noche, la poeta escribió una carta a su amor.	According to the sentence, who wrote the love letter? A. A female poet B. A male poet C. Both a female and male poet D. It's not clear from the sentence

Gender	Por la tarde, el turista fue a la playa.	<p>According to the sentence, who went to the beach?</p> <p>A. Both a male and female tourist</p> <p>B. A female tourist</p> <p>C. A male tourist</p> <p>D. It's not clear from the sentence</p>
Gender	Por la tarde, la turista fue a la playa.	<p>According to the sentence, who went to the beach?</p> <p>A. A male tourist</p> <p>B. A female tourist</p> <p>C. Both a male and female tourist</p> <p>D. It's not clear from the sentence</p>
Gender	Este semestre, el estudiante está tomando cuatro clases.	<p>According to the sentence, who is taking four classes?</p> <p>A. It's not clear from the sentence</p> <p>B. Both a male and female student</p> <p>C. A female student</p> <p>D. A male student</p>
Gender	Este semestre, la estudiante está tomando cuatro clases.	<p>According to the sentence, who is taking four classes?</p> <p>A. A female student</p> <p>B. A male student</p> <p>C. Both a female and male student</p> <p>D. It's not clear from the sentence</p>
Gender	Cada verano, el guía organiza un viaje a Costa Rica.	<p>According to the sentence, who organizes the trips to Costa Rica?</p> <p>A. Both a male and female guide</p> <p>B. It's not clear from the sentence</p> <p>C. A male guide</p> <p>D. A female guide</p>
Gender	Cada verano, la guía organiza un viaje a Costa Rica.	<p>According to the sentence, who organizes the trips to Costa Rica?</p> <p>A. A male guide</p> <p>B. A female guide</p> <p>C. Both a male and female guide</p> <p>D. It's not clear from the sentence</p>

Gender	Este año, el cantante tiene dos canciones muy famosas.	According to the sentence, who has two famous songs this year? A. Both a male and female singer B. It's not clear from the sentence C. A female singer D. A male singer
Gender	Este año, la cantante tiene dos canciones muy famosas.	According to the sentence, who has two famous songs this year? A. A female singer B. A male singer C. Both a female and male singer D. It's not clear from the sentence
Verb morph	Estudio para el examen en la biblioteca.	According to the sentence, who studies in the library? A. We do B. You do C. I do D. It's not clear from the sentence
Verb morph	Estudiamos para el examen en la biblioteca.	According to the sentence, who studies in the library? A. You do B. We do C. It's not clear from the sentence D. I do
Verb morph	Cada viernes toca la guitarra en un bar.	According to the sentence, who plays the guitar on Fridays? A. It's not clear from the sentence B. No one C. More than one person D. One person
Verb morph	Cada viernes tocan la guitarra en un bar.	According to the sentence, who plays the guitar on Fridays? A. More than one person B. One person C. No one D. It's not clear from the sentence

Verb morph	Cada verano, voy a California de vacaciones.	According to the sentence, who goes on vacation to California? A. We do B. You do C. I do D. It's not clear from the sentence
Verb morph	Cada verano, vamos a California de vacaciones.	According to the sentence, who goes on vacation to California? A. It's not clear from the sentence B. We do C. I do D. You do
Verb morph	Tiene un examen de matemáticas el jueves.	According to the sentence, who has a math exam? A. No one B. It's not clear from the sentence C. More than one person D. One person
Verb morph	Tienen un examen de matemáticas el jueves.	According to the sentence, who has a math exam? A. More than one person B. One person C. No one D. It's not clear from the sentence
Verb morph	Pienso hacer un minor en español.	According to the sentence, who is thinking of minoring in Spanish? A. You are B. We are C. I am D. It's not clear from the sentence
Verb morph	Pensamos hacer un minor en español.	According to the sentence, who is thinking of minoring in Spanish? A. I am B. We are C. You are D. It's not clear from the sentence

Verb morph	Viene a la fiesta esta noche.	According to the sentence, who is coming to the party tonight? A. More than one person B. No one C. It's not clear from the sentence D. One person
Verb morph	Vienen a la fiesta esta noche.	According to the sentence, who is coming to the party tonight? A. More than one person B. One person C. No one D. It's not clear from the sentence
Tense	Ana trabaja en una tienda de ropa.	According to the sentence, when does Ana working in a clothing store? A. She worked there in the past B. She will work there in the future C. She currently works there D. It's not clear from the sentence
Tense	Ana trabajó en una tienda de ropa	According to the sentence, when does Ana working in a clothing store? A. She currently works in a clothing store B. She worked there in the past C. She will work there in the future D. It's not clear from the sentence
Tense	Yo bebo jugo de naranja en la mañana.	According to the sentence, when do I drink orange juice? A. I will drink it in the future B. I drank it in the past C. It's not clear from the sentence D. I regularly drink it
Tense	Yo bebí jugo de naranja en la mañana.	According to the sentence, when do I drink orange juice? A. I drank it in the past B. I regularly drink it C. I will drink it in the future D. It's not clear from the sentence

Tense	Para hacer ejercicio, ellos caminan tres millas.	<p>According to the sentence, when do they walk three miles?</p> <p>A. They will walk in the future. B. They walked in the past C. They regularly walk three miles D. It's not clear from the sentence</p>
Tense	Para hacer ejercicio, ellos caminaron tres millas.	<p>According to the sentence, when do they walk three miles?</p> <p>A. They regularly walk three miles. B. They walked in the past C. They will walk in the future D. It's not clear from the sentence</p>
Tense	En el desayuno, Rosa come huevos con chorizo.	<p>According to the sentence, when does Rosa eat eggs and chorizo for breakfast?</p> <p>A. It's not clear from the sentence B. She ate it in the past C. She will eat it in the future D. She regularly eats it</p>
Tense	En el desayuno, Rosa comió huevos con chorizo.	<p>According to the sentence, when does Rosa eat eggs and chorizo for breakfast?</p> <p>A. She ate it in the past B. She regularly eats it C. She will eat it in the future D. It's not clear from the sentence</p>
Tense	Por la tarde, yo duermo dos horas.	<p>According to the sentence, when do I sleep two hours?</p> <p>A. I will sleep in the future B. I slept in the past C. I regularly sleep two hours D. It's not clear from the sentence</p>
Tense	Por la tarde, yo dormí dos horas.	<p>According to the sentence, when do I sleep two hours?</p> <p>A. I will sleep in the future B. I slept in the past C. I regularly sleep two hours D. It's not clear from the sentence</p>

Tense	Los estudiantes llegan a la clase a las 8:00.	<p>According to the sentence, when do the students arrive for class?</p> <p>A. It's not clear from the sentence</p> <p>B. They arrived in the past at 8:00</p> <p>C. They will arrive at 8:00 in the future</p> <p>D. They regularly arrive at 8:00</p>
Tense	Los estudiantes llegaron a la clase a las 8:00.	<p>According to the sentence, when do the students arrive for class?</p> <p>A. They arrived at 8:00 in the past</p> <p>B. It's not clear from the sentence</p> <p>C. They will arrive at 8:00 in the future</p> <p>D. They regularly arrive at 8:00</p>
Aspect	En Navidad, Marta comió mucho chocolate.	<p>According to the sentence, how often did Marta eat chocolate at Christmas?</p> <p>A. Never</p> <p>B. One time in the past</p> <p>C. Regularly in the past</p> <p>D. It's not clear from the sentence</p>
Aspect	En Navidad, Marta comía mucho chocolate.	<p>According to the sentence, how often did Marta eat chocolate at Christmas?</p> <p>A. Never</p> <p>B. Regularly in the past</p> <p>C. One time in the past</p> <p>D. It's not clear from the sentence</p>
Aspect	Durante las vacaciones los niños fueron a Nogales.	<p>According to the sentence, how often did the children go on vacation to Nogales?</p> <p>A. It's not clear from the sentence</p> <p>B. Never</p> <p>C. Regularly in the past</p> <p>D. One time in the past</p>

Aspect	Durante las vacaciones los niños iban a Nogales.	<p>According to the sentence, how often did the children go on vacation to Nogales?</p> <p>A. Regularly in the past B. Never C. One time in the past D. It's not clear from the sentence</p>
Aspect	Antes de clase, mis amigos prepararon el desayuno.	<p>According to the sentence, how often before class did my friends prepare breakfast?</p> <p>A. Regularly in the past B. Never C. One time in the past D. It's not clear from the sentence</p>
Aspect	Antes de clase, mis amigos preparaban el desayuno.	<p>According to the sentence, how often before class did my friends prepare breakfast?</p> <p>A. Never B. Regularly in the past C. One time in the past D. It's not clear from the sentence</p>
Aspect	La semana pasada, yo llegué tarde al trabajo.	<p>According to the sentence, how often did I get to work late last week?</p> <p>A. It's not clear from the sentence B. Never C. Regularly in the past D. One time in the past</p>
Aspect	La semana pasada, yo llegaba tarde al trabajo.	<p>According to the sentence, how often did I get to work late last week?</p> <p>A. Regularly in the past B. Never C. It's not clear from the sentence D. One time in the past</p>

Aspect	Para celebrar mi cumpleaños, nosotros fuimos a mi restaurante favorito.	According to the sentence, when did we go to my favorite restaurant for my birthday? A. Regularly in the past B. Never C. Once in the past D. It's not clear from the sentence
Aspect	Para celebrar mi cumpleaños, nosotros íbamos a mi restaurante favorito.	According to the sentence, when did we go to my favorite restaurant for my birthday? A. Never B. Regularly in the past C. Once in the past D. It's not clear from the sentence
Aspect	Durante las vacaciones, los niños fueron a la casa de sus abuelos.	According to the sentence, when did the children go to their grandparents house? A. It's not clear from the sentence B. Never C. Regularly in the past D. Once in the past
Aspect	Durante las vacaciones, los niños íban a la casa de sus abuelos.	According to the sentence, when did the children go to their grandparents house? A. Regularly in the past B. Never C. It's not clear from the sentence D. Once in the past
Mood	La policia busca una casa que tiene una puerta roja	According to the sentence, what are the police looking for? A. It's not clear from the sentence B. Whether there is a house with a red door - they don't have a specific one in mind C. A specific house with a red door D. None of these

Mood	La policia busca una casa que tenga una puerta roja.	<p>According to the sentence, what are the police looking for?</p> <p>A. A specific house with a red door</p> <p>B. Whether there is a house with a red door - they don't have a specific one in mind</p> <p>C. None of these</p> <p>D. It's not clear from the sentence</p>
Mood	La profesora busca a un estudiante que habla español y inglés.	<p>According to the sentence, what is the professor looking for?</p> <p>A. It's not clear from the sentence</p> <p>B. Whether there is a student that speaks Spanish and English - she doesn't have a specific one in mind</p> <p>C. Neither</p> <p>D. A specific student that speaks Spanish and English</p>
Mood	La profesora busca a un estudiante que hable español y inglés.	<p>According to the sentence, what is the professor looking for?</p> <p>A. Whether there is a student that speaks Spanish and English - she doesn't have a specific one in mind</p> <p>B. It's not clear from the sentence</p> <p>C. None of these</p> <p>D. A specific student that speaks Spanish and English</p>
Mood	Los hombres buscan un bar que está en el centro.	<p>According to the sentence, what are the men looking for?</p> <p>A. A specific bar in town</p> <p>B. Whether there is a bar in town - they don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Los hombres buscan un bar que esté en el centro.	<p>According to the sentence, what are the men looking for?</p> <p>A. A specific bar in town</p> <p>B. Whether there is a bar in town - they don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>

Mood	Nosotros buscamos un restuarante por aquí que sirve comida mexicana.	<p>According to the sentence, what are we looking for?</p> <p>A. specific restaurante</p> <p>B. Whether there is a restaurant that serves mexican food - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Nosotros buscamos un restuarante por aquí que sirva comida Mexicana.	<p>According to the sentence, what are we looking for?</p> <p>A. specific restaurante</p> <p>B. Whether there is a restaurant that serves mexican food - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Buscamos una película de acción que tiene Salma Hayek	<p>According to the sentence, what am I looking for?</p> <p>A. A specific action movie with Salma Hayek</p> <p>B. Whether there is an action movie with Salma Hayek - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Buscamos una película de acción que tenga Salma Hayek	<p>According to the sentence, what am I looking for?</p> <p>A. A specific action movie with Salma Hayek</p> <p>B. Whether there is an action movie with Salma Hayek - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Nosotros buscamos un parque que tiene muchos árboles.	<p>According to the sentence, what are we looking for?</p> <p>A. A specific park with a lot of tree</p> <p>B. A park that might have a lot of trees - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>
Mood	Nosotros buscamos un parque que tenga muchos árboles.	<p>According to the sentence, what are we looking for?</p> <p>A. A specific park with a lot of tree</p> <p>B. A park that might have a lot of trees - we don't have a specific one in mind</p> <p>C. Neither</p> <p>D. It's not clear from the sentence</p>

Filler	Cada domingo, Andrea y Jorge limpian la casa.	According to the sentence, when do Andrea and Jorge clean the house? A. In the morning B. In the afternoon C. It's not clear from the sentence D. Neither
Filler	Pedro llama a su amiga Diana por teléfono.	According to the sentence, when does Pedro call Diana? A. In the morning B. It's not clear from the sentence C. In the afternoon D. Neither
Filler	El padre está hablando con la maestra de su hijo.	According to the sentence, who is the father talking to? A. It's not clear from the sentence B. His son's friend C. His son's mother D. Neither
Filler	Paula está hablando con Ramiro durante la clase.	According to the sentence, where is Paula talking to Ramiro? A. In a restaurant B. In a bar C. Neither D. It's not clear from the sentence
Filler	En mi casa, nadie toma café después de las 2:00 de la tarde.	According to the sentence, who drinks coffee after 2:00? A. One person B. Two people C. It's not clear from the sentence D. No one
Filler	Nadie hace la tarea en la clase de español.	According to the sentence, who does their homework in Spanish class? A. No one B. One person C. More than one person D. It's not clear from the sentence
Filler	Este año, vivo con dos amigos; una muchacha y un muchacho.	According to the sentence, who do I live with? A. A male roommate B. A female roommate C. Both a male and female roommate D. It's not clear from the sentence

Filler	Carla y Mateo fueron a un partido de fútbol.	According to the sentence, who went to the football game? A. It's not clear from the sentence B. Both a male and female C. A female D. A male
Filler	Nosotros tenemos un examen el jueves que viene.	According to the sentence, when do we have an exam? A. It's not clear from the sentence B. Regularly on Thursdays C. In the past D. In the future
Filler	Nosotros vamos a un concierto el viernes que viene.	According to the sentence, when are we going to the concert? A. In the future B. In the past C. Regularly on Fridays D. It's not clear from the sentence
Filler	Cristina nunca baila en los discotecas.	According to the sentence, when does Cristina dance in the clubs? A. Regularly B. One time C. Never D. It's not clear from the sentence
Filler	No me gusta la cerveza, y nunca la tomo.	According to the sentence, when do I drink beer? A. Regularly B. Never C. One time D. It's not clear from the sentence
Filler	Antes de clase, Evelyn y Linda buscan donde estacionar el carro.	According to the sentence, who looks for parking? A. It's not clear from the sentence B. Evelyn C. Linda D. Both of them
Filler	Durante el verano, el niño y su amigo juegan en el parque.	According to the sentence, who plays in the park? A. The child B. The child's friend C. Both of them D. It's not clear from the sentence

REFERENCES

- Aguirre, C. (2000). On the emergence of verb paradigms in one Spanish child. First Verbs: On the way to mini-paradigms. *Papers in Linguistics*, 18, 99.
- Alarcón, I. (2010). Advanced heritage learners of Spanish: A sociolinguistic profile for pedagogical purposes. *Foreign Language Annals*, 43(2), 269-288.
- Alarcón, I. (2011). Spanish gender agreement under complete and incomplete acquisition: Early and late bilinguals' linguistic behavior within the noun phrase. *Bilingualism: Language and Cognition*, 14(3), 332-350.
- Anderson, R. (1999a). Impact of first language loss on grammar in a bilingual child. *Communication Disorders Quarterly*, 21(1), 4-16.
- Anderson, R. (1999b). Loss of gender agreement in L1 attrition: Preliminary results. *Bilingual Research Journal*, 23(4), 389-408.
- Anderson, R. (2001). Learning and invented inflectional morpheme in Spanish by children with typical language skills and with specific language impairment (SLI). *International Journal of Language & Communication Disorders*, 36(1), 1-19.
- Anderson, R. (2012). First language loss in Spanish-speaking children. *Bilingual Language Development and Disorders in Spanish-English Speakers*, 2, 193-212.
- Atchley, P. (2015). *Processing instruction and redundant morphology in Spanish as a second language* (Doctoral dissertation). Retrieved from ProQuest Database.
- Au, T. K., Knightly, L. M., Jun, S. A., & Oh, J. S. (2002). Overhearing a language during childhood. *Psychological Science*, 13(3), 238-243.

- Au, T. K., Oh, J. S., Knightly, L. M., Jun, S. A., & Romo, L. F. (2008). Salvaging a childhood language. *Journal of memory and language*, 58(4), 998-1011.
- Austin, J. (2001). *Language differentiation and the acquisition of morphosyntax in bilingual Basque/Spanish children* (Doctoral dissertation). Retrieved from ProQuest Database.
- Bardovi-Harlig, K., & Stringer, D. (2010). Variables in second language attrition. *Studies in Second Language Acquisition*, 32(1), 1-45.
- Basham, C., & Fathman, A. K. (2008). The latent speaker: Attaining adult fluency in an endangered language. *International Journal of Bilingual Education and Bilingualism*, 11(5), 577-597.
- Beaudrie, S. (2006). *Spanish heritage language development: A causal-comparative study exploring the differential effects of heritage versus foreign language curriculum* (Doctoral dissertation). Retrieved from ProQuest Database.
- Beaudrie, S. (2009a). Spanish receptive bilinguals understanding the cultural and linguistic profile of learners from three different generations. *Spanish in Context*, 6(1), 85-104.
- Beaudrie, S. (2009b). Teaching Spanish heritage learners and the nativeness issue. *ADFL Bulletin*, 41(1), 94.
- Beaudrie, S. (2011). Spanish heritage language programs: A snapshot of current programs in the southwestern United States. *Foreign Language Annals*, 44(2), 321-337.
- Beaudrie, S., & Ducar, C. (2005). Beginning level university heritage programs: Creating a space for all heritage language learners. *Heritage Language Journal*, 3(1), 1-26.
- Beaudrie, S., Ducar, C., & Potowski, K. (2014). *Heritage language teaching: Research and practice*. New York, NY: McGraw-Hill Education Create.

- Beaudrie, S.M., & Fairclough, M. A. (2012). *Spanish as a heritage language in the United States: The state of the field*. Washington, D.C.: Georgetown University Press.
- Bel, A. (2001). The projection of aspect: A key in the acquisition of finiteness. In M. Almgren et al., (Eds.), *Research on Child Language Acquisition. Proceedings of the 8th Conference of the International Association for the Study of Child Language* (pp. 1297-1313). Somerville, MA: Cascadilla Press.
- Blake, R. (1983). Mood selection among Spanish-speaking children, ages 4 to 12. *Bilingual Review/La Revista Bilingüe*, 10(1), 21-32.
- Bley-Vroman, R., & Masterson, D. (1989). Reaction time as a supplement to grammaticality judgements in the investigation of second language learners' competence. *University of Hawai'i Working Papers in English as a Second Language*, 8(2).
- Bley-Vroman, R. & Chaudron, C. (1994). Elicited imitation as a measure of second-language competence. *Research methodology in second-language acquisition*, 245-261.
- Bolger, P. A., & Zapata, G. C. (2011). Psycholinguistic approaches to language processing in heritage speakers. *Heritage Language Journal*, 8(1), 1-29.
- Bolonyai, A. (2007). (In)vulnerable agreement in incomplete bilingual L1 learners. *International Journal of Bilingualism*, 11(1), 3-23.
- Bowden, H. W. (2016). Assessing second-language oral proficiency for research: The Spanish elicited imitation task. *Studies in Second Language Acquisition*, 38(4), 647-675.
- Bowles, M. A. (2011). Exploring the role of modality: L2-heritage learner interactions in the Spanish language classroom. *Heritage Language Journal*, 8(1), 30-65.
- Brown, G., Malmkjaer, K., & Williams, J. (1996). *Performance and competence in second language acquisition*. Cambridge, United Kingdom: Cambridge University Press.

- Bybee, J. (1985). *Morphology: A study of the relation between meaning and form*. Amsterdam, Netherlands: John Benjamins Publishing.
- Bybee, J. (1995). Regular morphology and the lexicon. *Language and cognitive processes*, 10(5), 425-455.
- Cairns, H. S. (2010). *Fundamentals of psycholinguistics*. Hoboken, NJ: John Wiley & Sons.
- Campbell, R. N., & Rosenthal, J. W. (2000). Heritage languages. *Handbook of Undergraduate Second Language Education*, 165-184.
- Carreira, M. (2000). Validating and promoting Spanish in the United States: Lessons from linguistic science. *Bilingual Research Journal*, 24(4), 423-442.
- Carreira, M. (2003). Pedagogical implications of the changing demographics and social status of US Hispanics. In A. Roca & M. Colombi (Eds.), *Mi Lengua: Spanish as a Heritage language in the United States* (pp. 51-77). Washington, D.C.: Georgetown University Press
- Carreira, M. (2004). Seeking explanatory adequacy: A dual approach to understanding the term. *Heritage Language Journal*, 2(1).
- Carreira, M., & Kagan, O. (2011). The results of the national heritage language survey: Implications for teaching, curriculum design, and professional development. *Foreign Language Annals*, 44(1), 40-64.
- Carter, P. M. (2014). National narratives, institutional ideologies, and local talk: The discursive production of Spanish in a “new” US Latino community. *Language in Society*, 43(2), 209-240.
- Carvalho, Ana M. (2012-). *Corpus del Español en el Sur de Arizona (CESA)*. University of Arizona. cesa.arizona.edu.

- Chevalier, J. F. (2004). Heritage language literacy: Theory and practice. *Heritage Language Journal*, 2(1), 1-19.
- Child, M. W. (2014). *Cross-linguistic influence in L3 Portuguese acquisition: Language learning perceptions and the knowledge and transfer of mood distinctions by three groups of English-Spanish bilinguals* (Doctoral dissertation). Retrieved from ProQuest Database.
- Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge: M.I.T. Press.
- Clahsen, H., Avelado, F., & Roca, I. (2002). The development of regular and irregular verb inflection in Spanish child language. *Journal of Child Language*, 29(3), 591-622.
- Colombi, M. C., & Roca, A. (2003). *Mi lengua: Spanish as a heritage language in the United States, research and practice*. Washington, D.C.: Georgetown University Press.
- Comrie, B. (1976). *Aspect: An introduction to the study of verbal aspect and related problems*. Cambridge, United Kingdom: Cambridge University Press.
- Cuza, A. (2002). Attrition and the 'compounding parameter': L1 Spanish in a contact situation with English. *International Conference on First Language Attrition* (pp. 22-24). Amsterdam, Netherlands.
- Cuza, A., & Perez-Tattam, R. (2016). Grammatical gender selection and phrasal word order in child heritage Spanish: A feature re-assembly approach. *Bilingualism: Language and Cognition*, 19(1), 50-68.
- Cuza, A., Pérez-Tattam, R., Barajas, E., Miller, L., & Sadowski, C. (2013). The development of tense and aspect morphology in child and adult heritage Spanish: Implications for heritage language pedagogy. *Innovative Research and Practices in Second Language Acquisition and Bilingualism*, 193-220.

- Döpke, S. (1992). *One parent one language: An interactional approach* (Vol. 3). John Benjamins Publishing.
- Dorian, N. C. (1981). *Language death: The life cycle of a Scottish Gaelic dialect*. Philadelphia, PA: University of Pennsylvania Press.
- Ecke, P. (2004). Language attrition and theories of forgetting: *A cross-disciplinary review*. *International Journal of Bilingualism*, 8(3), 321-354.
- Erlam, R. (2006). Elicited imitation as a measure of L2 implicit knowledge: An empirical validation study. *Applied linguistics*, 27(3), 464-491.
- Ellis, R. (2005). Measuring implicit and explicit knowledge of a second language: A psychometric study. *Studies in second language acquisition*, 27(2), 141-172.
- Ezeizabarrena, M. J. (1997). Morfemas de concordancia con el sujeto y con los objetos en el castellano infantil. *Contemporary Perspectives on the Acquisition of Spanish*, 1, 21-36.
- Fernández-Martínez, A. (1994). El aprendizaje de los morfemas verbales. Datos de un estudio longitudinal (Learning verbal morphemes. Data from a longitudinal Study). In S. L. Ornat (Ed.), *La adquisición de la lengua española* (pp. 29-46). Madrid: Siglo XXI.
- Fishman, J. A. (1966). Language loyalty in the United States: The maintenance and perpetuation of non-English mother tongues by American ethnic and religious groups. *American Journal of Sociology*, 72(6), 690-691.
- Fishman, J. A. (2001). *Can threatened languages be saved*. Clevedon, United Kingdom: Multilingual Matters, EDT.
- Fromkin, V. (1973). *Slips of the tongue*. San Francisco, CA: WH Freeman.
- García, O. (2005). Positioning heritage languages in the United States. *The Modern Language Journal*, 89(4), 601-605.

- Gass, S. (1994). The reliability of second-language grammaticality judgments. In E. Tarone, S. Gass & A. Cohen (Eds.), *Research methodology in second language acquisition* (pp. 303-322). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Gathercole, V. C. M., Sebastián, E., & Soto, P. (1999). The early acquisition of Spanish verbal morphology: Across-the-board or piecemeal knowledge? *International Journal of Bilingualism*, 3(2-3), 133-182.
- Gürel, A. (2004). Selectivity in L2-induced L1 attrition: A psycholinguistic account. *Journal of Neurolinguistics*, 17(1), 53-78.
- Harris, J. W. (1991). The exponence of gender in Spanish. *Linguistic Inquiry*, 22(1), 27-62.
- Hernández-Pina, F. (1984). Actitudes lingüísticas parentales y desarrollo del lenguaje infantil. *Infancia y Aprendizaje*, 7(25), 35-59.
- Hodgson, M. (2005). Children's production and comprehension of Spanish grammatical aspect. *Amsterdam Studies in the Theory and History of Linguistic Science Series*, 4, 125.
- Jacobson, P. F. (2012). The effects of language impairment on the use of direct object pronouns and verb inflections in heritage Spanish speakers: A look at attrition, incomplete acquisition and maintenance. *Bilingualism: Language and Cognition*, 15(1), 22-38.
- Jakobson, R. (1941). 1968. *Child Language, Aphasia and Phonological Universals*. The Hague: Mouton
- Kagan, O., & Friedman, D. (2003). Using the OPI to place heritage speakers of Russian. *Foreign Language Annals*, 36(4), 536-545.
- Kanno, K., Hasegawa, T., Ikeda, K., Ito, Y., & Long, M. H. (2008). Relationships between prior language-learning experience and variation in the linguistic profiles of advanced English-speaking learners of Japanese. *Heritage Language Education*, 165-180.

- Keijzer, M. (2010). The regression hypothesis as a framework for first language attrition. *Bilingualism: Language and Cognition*, 13(1), 9-18.
- Kondo–Brown, K. (2005). Differences in language skills: Heritage language learner subgroups and foreign language learners. *The Modern Language Journal*, 89(4), 563-581.
- Kondo-Brown, K. (2006). *Heritage language development: Focus on east Asian immigrants*. Amsterdam, Netherlands: John Benjamins Publishing.
- Köpke, B. (2004). Neurolinguistic aspects of attrition. *Journal of Neurolinguistics*, 17(1), 3-30.
- Köpke, B., & Schmid, M. S. (2004). Language attrition. *First Language Attrition: Interdisciplinary Perspectives on Methodological Issues*, 28(1)
- Köpke, B., Schmid, M. S., Keijzer, M., & Dostert, S. (Eds.). (2007). *Language attrition: Theoretical perspectives* (Vol. 33). Amsterdam, Netherlands: John Benjamins Publishing.
- Kupisch, T., & Rothman, J. (2016). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *International Journal of Bilingualism*. DOI: <https://doi.org/10.1177/1367006916654355>
- Leeman, J. (2005). Engaging critical pedagogy: Spanish for native speakers. *Foreign Language Annals*, 38(1), 35-45.
- Leeman, J. (2012). Investigating language ideologies in Spanish as a heritage language. In S. Beaudrie & M. Fairclough (Eds.), *Spanish as a heritage language in the United States: The state of the field* (pp. 43-59). Washington DC: Georgetown University Press.
- Leeman, J. (2015). Heritage language education and identity in the United States. *Annual Review of Applied Linguistics*, 35, 100-119.
- Leeman, J., & Martínez, G. (2007). From identity to commodity: Ideologies of Spanish in heritage language textbooks. *Critical Inquiry in Language Studies*, 4(1), 35-65.

- Leow, Ronald. Grammaticality judgment tasks and second-language development. *Georgetown University Round Table on Languages and Linguistics*, 126–39.
- Lleó, C. (2001). The interface of phonology and syntax: The emergence of the article in the early acquisition of Spanish and German. *Language Acquisition and Language Disorders*, 24, 23-44.
- López Ornat, S. (2003). *Learning earliest grammar: Evidence of grammar variations in speech before 22 months*. Somerville: Cascadilla Press.
- López Ornat, S., Fernández, A., Gallo, P., & Mariscal, S. (1994). *La adquisición de la lengua española*. Madrid: Siglo XXI.
- Lopez, M. H., & Minushkin, S. (2008). *2008 National Survey of Latinos: Hispanics See Their Situation in US Deteriorating; Oppose Key Immigration Enforcement Measures*. Washington, DC: Pew Hispanic Center.
- Lowe, P. (1998). Keeping the optic constant: A framework of principles for writing and specifying the AEI definitions of language abilities. *Foreign Language Annals*, 31(3), 358-380.
- Marinis, T. (2003). Psycholinguistic techniques in second language acquisition research. *Second language research*, 19(2), 144-161.
- Martínez, G. (2003). Classroom based dialect awareness in heritage language instruction: A critical applied linguistic approach. *Heritage Language Journal*, 1(1), 1-14.
- Martínez, G. A. (2009). Hacia una sociolingüística de la esperanza: El mantenimiento intergeneracional del español y el desarrollo de comunidades hispanohablantes en el sudoeste de los Estados Unidos. *Spanish in Context*, 6(1), 127-137.

- Martínez-Mira, M. (2005). Mood simplification: Adverbial clauses in heritage Spanish (Doctoral dissertation). Retrieved from ProQuest Database.
- Martínez-Mira, M. I. (2009). Spanish heritage speakers in the southwest: Factors contributing to the maintenance of the subjunctive in concessive clauses. *Spanish in Context*, 6(1), 105-126.
- Martínez-Gibson, E. A. (2011). A comparative study on gender agreement errors in the spoken Spanish of heritage speakers and second language learners. *Porta Linguarum: Revista Internacional De Didáctica De Las Lenguas Extranjeras*, 15, 177-193.
- McCarthy, C. (2008). Morphological variability in the comprehension of agreement: An argument for representation over computation. *Second Language Research*, 24(4), 459-486.
- McDonald, J. (2006). Beyond the critical period: Processing-based explanations for poor grammaticality judgment performance by late second language learners. *Journal of Memory and Language*, 55(3), 381-401.
- Meisel, J. M. (1997). The acquisition of the syntax of negation in French and German: Contrasting first and second language development. *Second Language Research*, 13(3), 227-263.
- Menken, K., & Kleyn, T. (2010). The long-term impact of subtractive schooling in the educational experiences of secondary English language learners. *International Journal of Bilingual Education and Bilingualism*, 13(4), 399-417.
- Miller, L., & Cuza, A. (2013). On the status of tense and aspect morphology in child heritage Spanish: An analysis of accuracy levels. *Proceedings of the 12th Generative Approaches to Second Language Acquisition Conference*, pp. 117-129.
- Montrul, S. (2002). Incomplete acquisition and attrition of Spanish tense/aspect distinctions in adult bilinguals. *Bilingualism: Language and Cognition*, 5(01), 39-68.

- Montrul, S. (2004a). *The acquisition of Spanish: Morphosyntactic development in monolingual and bilingual L1 acquisition and adult L2 acquisition*. Amsterdam, Netherlands: John Benjamins Publishing.
- Montrul, S. (2004b). Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and Cognition*, 7(02), 125-142.
- Montrul, S. (2006). On the bilingual competence of Spanish heritage speakers: Syntax, lexical- semantics and processing. *International Journal of Bilingualism*, 10(1), 37-69.
- Montrul, S. A. (2007). Interpreting mood distinctions in Spanish as a heritage language. In K. Potowski & R. Cameron (Eds.), *Spanish in contact policy, Social and linguistic inquiries*. Amsterdam, Netherlands: John Benjamins Publishing.
- Montrul, S. (2008). *Incomplete acquisition in bilingualism: Re-examining the age factor*. Amsterdam, Netherlands: John Benjamins Publishing.
- Montrul, S. (2009). Knowledge of tense-aspect and mood in Spanish heritage speakers. *International Journal of Bilingualism*, 13(2), 239-269.
- Montrul, S. (2010). Current issues in heritage language acquisition. *Annual Review of Applied Linguistics*, 30(1), 3-23.
- Montrul, S. (2011). Morphological errors in Spanish second language learners and heritage speakers. *Studies in Second Language Acquisition*, 33(2), 163-192.
- Montrul, S. A. (2012a). Is the heritage language like a second language?. *Eurosla Yearbook*, 12(1), 1-29.

- Montrul, S. (2012b). Bilingual background questionnaire for Spanish/English speakers, National Heritage Language Resource Center, retrieved from:
<http://www.nhlrc.ucla.edu/data/questionnaires.asp>
- Montrul, S., & Bowles, M. (2009). Back to basics: Incomplete knowledge of differential object marking in Spanish heritage speakers. *Bilingualism: Language and Cognition*, 12(03), 363-383.
- Montrul, S., Davidson, J., De La Fuente, I., & Foote, R. (2014). Early language experience facilitates the processing of gender agreement in Spanish heritage speakers. *Bilingualism: Language and Cognition*, 17(1), 118-138.
- Montrul, S., Foote, R., & Perpiñán, S. (2008). Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning*, 58(3), 503-553.
- Montrul, S., & Perpiñán, S. (2011). Assessing differences and similarities between instructed heritage language learners and L2 learners in their knowledge of Spanish tense-aspect and mood (TAM) morphology. *Heritage Language Journal*, 8(1), 90-133.
- Montrul, S., & Potowski, K. (2007). Command of gender agreement in school-age Spanish-English bilingual children. *International Journal of Bilingualism*, 11(3), 301-328.
- Mowbray, J. (2012). *Linguistic justice: International law and language policy*. Oxford University Press.
- Mueller Gathercole, V. C., Sebastián, E., & Soto, P. (1999). The early acquisition of Spanish verbal morphology: Across-the-board or piecemeal knowledge? *International Journal of Bilingualism*, 3(2-3), 133-182.
- Munnich, E., Flynn, S., and Martohardjono, G. (1994). Elicited imitation and grammaticality judgment tasks: What they measure and how they relate to each other. In E. Tarone, S. Gass,

- and A. Cohen (Eds.), *Research Methodology in Second-language Acquisition* (pp. 227-245). New Jersey: Lawrence Erlbaum.
- Myers-Scotton, C. (2006). Natural codeswitching knocks on the laboratory door. *Bilingualism Language and Cognition*, 9(2), 203.
- Núñez, G. (2016). *Translating in Linguistically Diverse Societies: Translation Policy in the United Kingdom*. Amsterdam, Netherlands: John Benjamins Publishing Company.
- Ortega, L. (2000). *Understanding syntactic complexity: The measurement of change in the syntax of instructed L2 Spanish learners* (Doctoral dissertation). Retrieved from ProQuest Database.
- Ortega, L., Iwashita, N., Rabie, S., & Norris, J. M. (1999). *A multi-language comparison of measures of syntactic complexity*. Honolulu: University of Hawaii, National Foreign Language Resource Center.
- Otheguy, R. (1982). Thinking about bilingual education: A critical appraisal. *Harvard educational review*, 52(3), 301-314.
- Otheguy, R. (2013). The linguistic competence of second-generation bilinguals: A critique of “incomplete acquisition”. *Romance linguistics*, 301-320.
- Otheguy, R. (2016). The linguistic competence of second-generation bilinguals. In *Romance Linguistics 2013: Selected papers from the 43rd Linguistic Symposium on Romance Languages (LSRL), New York, 17-19 April, 2013* (Vol. 9, p. 301). John Benjamins Publishing.
- Otheguy, R., & Zentella, A. C. (2012). *Spanish in New York: Language contact, dialectal leveling, and structural continuity*. New York, NY: OUP USA.

- Paradis, M. (2007). L1 attrition features predicted by a neurolinguistic theory of bilingualism. In B. Köpcke, M. S. Schmid, M. Keijzer, & S. Dostert (Eds.), *Language attrition: Theoretical perspectives* (pp. 121 – 133). Amsterdam, Netherlands: John Benjamins.
- Pascual y Cabo, D., & Rothman, J. (2012). The (il)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics*, 33(4), 450-455.
- Payne, T. E. (1997). *Describing morphosyntax: A guide for field linguists*. Cambridge University Press.
- Pearlmutter, N. J., Garnsey, S. M., & Bock, K. (1999). Agreement processes in sentence comprehension. *Journal of Memory and language*, 41(3), 427-456.
- Penny, R. J. (2002). *A history of the Spanish language*. Cambridge University Press.
- Perea, J. (2003). A brief history of race and the US-Mexican border: Tracing the trajectories of conquest. *UCLA L. Rev.* 51, 283.
- Pérez-Pereira, M. (1989). The acquisition of morphemes: Some evidence from Spanish. *Journal of Psycholinguistic Research*, 18(3), 289-312.
- Pérez, Á., Sala, R., & Santamarina, M. (1993). *Cassell's contemporary Spanish*. London, United Kingdom: MacMillan Publishing
- Pérez-Leroux, A. T. (1998). The acquisition of mood selection in spanish relative clauses. *Journal of Child Language*, 25(03), 585-604.
- Pires, A., & Rothman, J. (2009). Disentangling sources of incomplete acquisition: An explanation for competence divergence across heritage grammars. *International Journal of Bilingualism*, 13(2), 211-238.
- Polinsky, M. (2006). Incomplete acquisition: American Russian. *Journal of Slavic linguistics*, 191-262.

- Polinsky, M. (2008). Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *The Heritage Language Journal*, 6, 40–71
- Potowski, K., & Carreira, M. (2010). Spanish in the USA. Language diversity in the United States. In K. Potowski (Ed.), *Language diversity in the USA*, (pp. 66-80). Cambridge: Cambridge University Press.
- Potowski, K., Jegerski, J., & Morgan-Short, K. (2009). The effects of instruction on linguistic development in Spanish heritage language speakers. *Language Learning*, 59(3), 537-579.
- Potowski, K., Parada, M., & Morgan-Short, K. (2012). Developing an online placement exam for Spanish heritage speakers and L2 students. *Heritage Language Journal*, 9(1), 51-76.
- Putnam, M. T., & Sánchez, L. (2013). What's so incomplete about incomplete acquisition?: A prolegomenon to modeling heritage language grammars. *Linguistic Approaches to Bilingualism*, 3(4), 478-508.
- Quené, H., & Van den Bergh, H. (2008). Examples of mixed-effects modeling with crossed random effects and with binomial data. *Journal of Memory and Language*, 59(4), 413-425.
- Rehbein, J., ten Thije, J. D., & Verschik, A. (2012). Lingua receptiva (LaRa)—remarks on the quintessence of receptive multilingualism. *International Journal of Bilingualism*, 16(3), 248-264.
- Roca, A. (2003). *Mi lengua: Spanish as a heritage language in the United States, research and practice*. Washington, DC: Georgetown University Press.
- Saussure, F. (2011). *Course in general linguistics*. Columbia University Press.
- Schachter, J. (1990). On the issue of completeness in second language acquisition. *Second Language Research*, 6(2), 93-124.

- Schlyter, S. (1993). L2• the weaker language in bilingual Swedish-French children. *Progression & Regression in Language: Sociocultural, Neuropsychological, & Linguistic Perspectives*, 289.
- Schlyter, S., & Håkansson, G. (1994). Word order in Swedish as the first language, second language and weaker language in bilinguals. *Scandinavian Working Papers in Bilingualism*, 9, 49-66.
- Schmid, M. S. (2002). *First language attrition, use and maintenance: The case of German Jews in Anglophone countries*. Amsterdam, Netherlands: John Benjamins Publishing.
- Schmid, M. (2010). New perspectives on L1 attrition. *Bilingualism: Language and Cognition* 13(1)
- Schmitt, E. (2010). When boundaries are crossed: Evaluating language attrition data from two perspectives. *Bilingualism: Language and Cognition*, 13(1), 63-72.
- Schüppert, A., & Gooskens, C. (2012). The role of extra-linguistic factors in receptive bilingualism: Evidence from Danish and Swedish pre-schoolers. *International Journal of Bilingualism*, 16(3), 332-347.
- Sebastián, E., & Slobin, D. (1994). Development of linguistic forms: Spanish. In Berman & Slobin (Eds.), 239-284
- Sherkina-Lieber, M. (2011). *Comprehension of Labrador Inuttit Functional morphology by receptive bilinguals* (Doctoral dissertation). Retrieved from ProQuest Database.
- Sherkina-Lieber, M., Perez-Leroux, A. T., & Johns, A. (2011). Grammar without speech production: The case of Labrador Inuttit heritage receptive bilinguals. *Bilingualism: Language and Cognition*, 14(03), 301-317.

- Silva-Corvalán, C. (1986). Bilingualism and language change: The extension of *estar* in Los Angeles Spanish. *Language*, 587-608.
- Silva-Corvalán, C. (1991). Spanish language attrition in a contact situation with English. *First Language Attrition*, 151.
- Silva-Corvalán, C. (1994a). *Language contact and change: Spanish in Los Angeles*. Oxford: Oxford University Press.
- Silva-Corvalán, C. (1994b). The gradual loss of mood distinctions in Los Angeles Spanish. *Language variation and change*, 6(3), 255.
- Silva-Corvalán, C. (1997). El español hablado en Los Angeles: Aspectos sociolingüísticos. In M.C. Colombi & F.X. Alarcon (Eds.), *La enseñanza del español a hispanohablantes* (pp. 140-155). Boston, MA: Houghton Mifflin Company
- Silva-Corvalán, C. (2001). Aspectos lingüísticos del español en Los Ángeles. *Centro Virtual Cervantes*, 2001-2002.
- Silva-Corvalán, C. (2003). Linguistic consequences of reduced input in bilingual first language acquisition. In S. Montrul & F. Ordóñez (Eds.), *Linguistic theory and language development in hispanic languages* (pp. 375–397). Somerville, MA: Cascadilla Press.
- Silva-Corvalán, C. (2014). *Bilingual language acquisition: Spanish and English in the first six years*. Cambridge University Press.
- Smith, Ray G. *Moorland is cold country*. Unpublished manuscript. Reprinted from Anzaldúa, G. (1987). How to tame a wild tongue. In *Borderlands/La Frontera: The new mestiza*. San Francisco, CA: Aunt Lute

- Sorace, A. (2000). Differential effects of attrition in the L1 syntax of near-native L2 speakers. In *Proceedings of the 24th Boston University conference on language development* (pp. 719-725).
- Sorace, A., & Filiaci, F. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research*, 22(3), 339-368.
- Stritikus, T. (2002). *Immigrant Children and the Politics of English-Only: Views from the Classroom. The New Americans: Recent Immigration and American Society*. New York, NY: LFB Scholarly Publishing,
- Suarez, D. (2002). The paradox of linguistic hegemony and the maintenance of Spanish as a heritage language in the United States. *Journal of Multilingual and Multicultural Development*, 23(6), 512-530.
- Taylor, D. S. (1988). The meaning and use of the term ‘competence’ in linguistics and applied linguistics. *Applied Linguistics*, 9(2), 148-168.
- Tracy-Ventura, N., McManus, K., Norris, J., & Ortega, L. (2014). “Repeat as much as you can”: Elicited imitation as a measure of oral proficiency in L2 French. In P. Leclercq, A. Edmonds, & H. Hilton (Eds.), *Measuring L2 Proficiency: Perspectives from SLA* (pp. 143-166). Bristol: Multilingual Matters.
- Tsimpli, I., & Sorace, A. (2006). Differentiating interfaces: L2 performance in syntaxsemantics and syntax-discourse phenomena. In: Bamman, D., Magnitskaia, T., Zaller, C. (Eds.), *Proceedings of the 30th Annual Boston University Conference on Language Development* (pp. 653-664). Somerville: Cascadilla Press.
- Tsimpli, I., Sorace, A., Heycock, C., & Filiaci, F. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International Journal of Bilingualism*, 8(3), 257-277.

- Valdés, G. (1981). Pedagogical implications of teaching Spanish to the Spanish-speaking in the united states. *Teaching Spanish to the Hispanic Bilingual: Issues, Aims, and Method*, 3-20.
- Valdés, G. (1989). Teaching Spanish to Hispanic bilinguals: A look at oral proficiency testing and the proficiency movement. *Hispania*, 72(2), 392-401.
- Valdés, G. (1995). The teaching of minority languages as academic subjects: Pedagogical and theoretical challenges. *The Modern Language Journal*, 79(3), 299-328.
- Valdés, G. (1997). The teaching of Spanish to bilingual Spanish-speaking students: Outstanding issues and unanswered questions. In M. C. Colombi & F. Alarcón (Eds.), *La enseñanza del español a hispanohablantes* (pp. 8–44). Boston, MA: Houghton Mifflin.
- Valdés, G. (2000). Spanish for native speakers. vol. 1. *AATSP Professional Development Series Handbook for Teachers K-16*. New York: Harcourt College Publishers.
- Valdés, G. (2005). Bilingualism, heritage language learners, and SLA research: Opportunities lost or seized?. *The Modern Language Journal*, 89(3), 410-426.
- Valdés, G. (2012). Afterword: future directions for the field of Spanish as a heritage language. In S. Beaudrie & M Fairclough (Eds.), *Spanish as a heritage language in the United States: The state of the field* (pp.279-289). Washington, DC: Georgetown University Press.
- Valdés-Fallis, G. (1978). Code switching and the classroom teacher. *Language in education: Theory and practice, Volume 4*. Wellington, VA: Center for Applied Linguistics.
- Vandergrift, L. (1999). Facilitating second language listening comprehension: Acquiring successful strategies. *English Language Teaching Journal*, 53, 168–176.
- Van Deusen-Scholl, N. (2003). Toward a definition of heritage language: Sociopolitical and pedagogical considerations. *Journal of Language, Identity, and Education*, 2(3), 211-230.
- Vendler, Z. (1967). *Linguistics in philosophy*. Ithaca, NY: Cornell University Press.

- Villa, D. J. (2002). The sanitizing of US Spanish in academia. *Foreign Language Annals*, 35(2), 222-230.
- Villa, D. J., & Rivera-Mills, S. V. (2009). An integrated multi-generational model for language maintenance and shift the case of Spanish in the southwest. *Spanish in Context*, 6(1), 26-42.
- Villegas Erce, A. (2014). *The role of L2 English immersion in the processing of L1 Spanish sentence complement/relative clause ambiguities* (Doctoral dissertation). Retrieved from ProQuest Database.
- Vinther, T. (2002). Elicited imitation: A brief overview. *International Journal of Applied Linguistics*, 12(1), 54-73.
- Pascual y Cabo, D., Lingwall, A., & Rothman, J. (2012) Applying the interface hypothesis to heritage speaker acquisition: Evidence from Spanish mood. In Alia K. Biller, Esther Y. Chung & Amelia E. Kimball (Eds.), *Proceedings of the 36th annual Boston University conference on language development* (pp. 437–448). Somerville, MA: Cascadilla Press.
- Webb, John & Miller, Barbara (Eds.) (2000) *Teaching heritage language learners: Voices from the classroom*. Yonkers, NY: ACTFL.
- Zamora, C. (2015). Using elicited imitation tasks in order to measure Spanish heritage speakers' proficiency. Manuscript in preparation.
- Zentella, A. C. (1997). *Growing up bilingual: Puerto Rican children in New York*. Oxford: Blackwell.