Chinese-English and Spanish-English Dual Language Learners' Bilingual Narrative Skills

By

MAYU LINDBLAD
DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Education

in the

OFFICE OF GRADUATE STUDIES

of the

UNIVERSITY OF CALIFORNIA

DAVIS

Approved:

Yuuko Uchikoshi Tonkovich, Chair

Nicole Sparapani

Rufan Luo

Committee in Charge

2023

Abstract

The purpose of the dissertation study was to explore early bilingual narratives for Chinese-English and Spanish-English dual language learners (DLLs) enrolled in Head Start programs to reveal what narrative skills they present in English and the heritage language (HL). The study first analyzed narrative microstructure, or lexical and grammatical skills as well as macrostructure, or overall narrative quality to explore similarities and differences between narrative abilities of the two language groups. The study also compared advanced and less advanced narrative characteristics qualitatively to elucidate in what way their presentation of the same story differs, and to understand how less advanced narratives can be improved by comparing exemplifying quotes. The associations of microstructure and macrostructure in English and HL were then examined through Pearson correlation analysis for both the Chinese and Spanish groups. In order to examine the interdependence hypothesis (Cummins, 1981) at the macrostructure level, the study employed multiple linear regression analysis and tested whether English macrostructure is predicted by HL macrostructure. The second regression model also examined whether English macrostructure is predicted by HL macrostructure after controlling for English microstructure to explore significant predictors of English narratives. The narrative data were collected from 77 Chinese-English and 48 Spanish-English DLLs from Head Start programs in Northern California. Their home language was either Chinese or Spanish, and at least one of their parents identified themselves as Chinese American or Mexican American. The narrative data in both English and HL were collected using a wordless picture book. The results from the descriptive statistics showed that overall, there were no statistically significant differences among the English and HL macrostructure and English microstructure for the two language groups. The Spanish group organized events in a chronological order in English more

than the Chinese group and the differences were significant. The results from the qualitative analysis showed that the advanced and less advanced narratives were distinct in four characteristics such as syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions for both language groups. The results from the Pearson correlation showed within-language associations of macrostructure and microstructure in English for the Chinese and Spanish groups. Cross-linguistic correlations of macrostructure and microstructure were observed only for the Chinese group. Further, the multiple linear regression analysis showed no significant association between English and HL macrostructure when controlling for within-language microstructure for both language groups. Within-language microstructure, or English microstructure, predicted English macrostructure, and HL macrostructure was not a significant predictor of English macrostructure for both groups. Age was not a significant predictor of English macrostructure in the two regression models for the Chinese group, and it was significant for the first regression model for the Spanish group. Sex differences were included as a control variable in the regression model only for the Chinese group, and it was not a significant predictor of English macrostructure. Overall, the results from this study suggest that the DLLs from two language groups could be taught in similar ways in that they were more similar than different in their narrative skills. Due to their differences in mentioning temporality, the Chinese group may be taught more temporal relations of events with connectives. Educators and parents of young DLLs may emphasize overall narrative quality like talking about small event components and connecting these components to strengthen their narratives skills. The data showed strong associations between macrostructure and microstructure which suggests that children should have strong vocabulary and grammar skills to construct better quality narratives.

ACKNOWLEDGEMENTS

My dissertation study couldn't have been completed without the support of people around me. My family, friends, professors, colleagues, and students supported my career as a teacher and a researcher. My dissertation chair, advisor, and mentor, Dr. Yuuko Uchikoshi Tonkovich, has supported me before the start of the PhD program and throughout my academic journey. In addition to research skills, I have learned so many things under your caring and positive guidance. Thank you so much for all of your support, Yuuko Sensei. My dissertation committee, Dr. Nicole Sparapani, has also guided me through the course staking stage, qualifying exam, and writing the method and analysis sections of my dissertation. I will always remember to look at the data characteristics in detail and analyze data thoroughly to conduct robust studies. Thank you, Nicole. My external dissertation committee, Dr. Rufan Luo, has also provided me with productive feedback about narratives and working with demographically diverse populations, or DLLs. Your prompt responses and careful review helped me move forward. I really appreciate you taking the time to improve my study.

Thank you also to all the professors from the School of Education and the Department of Linguistics who supported me during the course taking stage. I also thank my cohort, Stacy Wittstock, Jackson Yang, Sombo Koo, Alicia Garcia, Ambar Hernandez, Erin Winters, and Britanny Derieg, who motivated me to survive earlier in the program. I'm so happy that we started the program together and supported each other in various ways. My senior colleagues, Kaozong Mouavangsou, JaNay Brown-Wood, and Sergio Sanchez, taught me how to navigate in academia. Thank you so much. I also thank all the people from the Language and Literacy Development Laboratory. Lu Yang, Emily Mak, and Maria Buttiler, thank you for working with

me and making the best team. Without the lab, I couldn't have learned so much about data collection, data processing like transcribing, and data analysis. I also learned about the great benefits of teamwork. All the research assistants who worked with me for the lab, thank you all for your diligent work. Thank you to Anamar Flores and Melody Woo for coding the data. Thank you also to Dr. Qing Zhou, the project LEAD, the participants, and all the team members from UC Berkeley. Weekly meetings with Ezra Mauer were very beneficial to discuss the data and statistical questions. Thank you.

I appreciate the staff members of the School of Education who always supported me. Thank you to Mary Reid for answering all my questions regarding different university regulations so promptly. Thank you to Kerry Hasa for helping with teaching assistantship and training. I will always remember the class for international students, meetings, and events. Thank you to the IT team and Eva Guralnick. Thank you to my writing consultants.

East Asian Languages and Cultures, thank you so much for providing me with a position as an Associate In for several years. Japanese Language Program Coordinator, Dr. Nobuko Koyama has always guided me in teaching and life in academia. Koyama Sensei, I'm so happy that I could work with you. Thank you so much to all the Japanese teachers who helped me to improve my teaching skills as teaching also influenced my research. I also appreciate the people who cheered me up at work every day in the Sproul building 4th floor. Thank you to Uchida Sensei. Thank you to my students who took my Japanese classes, especially those who took my classes for more than two quarters. Teaching has been my joy and motivated me to get up to go to work. I enjoyed working with you all.

There were friends who shared similar interests and stimulated my curiosity in language learning and teaching. Cari Ito, Jeff Moran, Ryan Redmond, Claudia Gurrero, and Aya Williams, I enjoyed discussions about language acquisition and our personal international experiences, thank you.

The people from my previous work have also supported me before and during my PhD program. Eleonor Jonasson-Brady, thank you for your support especially in recent years to stay positive. Dr. Kimihiko Nomura, has always supported my interests as well as personal and career development. Thank you, Nomura Sensei. All the teachers from ALCI, thanks to you, I am here today. My previous colleagues from the former International Languages, Literatures, and Cultures at Chico State, thank you all. Linguistics department of Fresno State, thank you for the opportunities to work and learn. The basics I built up at Fresno State have helped me conduct language acquisition studies. Dr. Jidong Chen and Dr. Jean Wang, thank you so much for your support. Jidong, you, Thomas, and the kids have encouraged me so many times to continue research. Two important professors from my undergraduate studies, Dr. Chein-Man Lee and Dr. Kenneth Schmidt, have also continued their support for many years. Lee Sensei and Ken Sensei, thank you so much.

My friends also helped me while achieving challenging goals. Fumi, you've always been there for me and I cannot thank you enough. O, Emi, and Sonoko, thank you for supporting me as my best friends. Thank you to Ikuyo. Alexandra, tack. Friends and the host family in Slovenia, hvala. Thank you to my friends from the gym for pumping up my energy. Val, Mike, and their family and friends, thank you guys. Thank you to Martha and Dale. Thank you to Cynthia, Richard, and Linda. My American host family, thanks to your support, I am here.

Finally, thank you so much to my American family for your support. Tack så mycket to my Swedish family. Thanks to my grandparents who focused on education, I could go to college and study abroad. Thank you to my parents who have always supported me in anything I wanted to accomplish. Thank you to my siblings and their family. Thank you to my husband who supported me endlessly in this journey.

LIST OF TABLES

Table of Contents

Chapter I: Introduction

Introduction

Children from various cultures learn to tell stories to share their experiences with listeners at early ages. They explain fun activities that they experienced at school to their parents or talk about their play time with imaginary friends. Small steps in sharing such narratives become more advanced as they practice storytelling while they move onto advanced grades. At school, children are asked to present information to their classmates who did not share the same experiences or to those who don't share the same knowledge and information. Peterson and McCabe (1994) noted that such presentation skills of decontextualized information are valued and have been largely practiced in North American schools. They noted that narratives require the presentation of stories from experiences not shared by a listener, so a storyteller needs to organize the information in a way that is understood by the listener. Thus, children make and organize sentences in sequence to become good presenters. Past studies stated that children with advanced narrative skills have an easier time transitioning to literacy activities because narrative skills prepare them to connect written and oral languages (e.g., Heath, 1982; Peterson & McCabe, 1994). Hence, the narrative is a powerful tool frequently used throughout children's lives and supports their language development and academic success.

Because children take advantage of narrative skills to learn throughout their educational journeys, this dissertation study is meant to examine narrative data from children who are learning two languages at a young age as well as to inform their educators and parents in guiding

the children who develop bilingual skills. Specifically, the study investigated young dual language learners' (DLLs) oral language skills measured by narratives at the macrostructure and microstructure levels. This chapter first provides background information from national data such as the reports from the U.S. Census Bureau and the U.S. Department of Education to present the increasing numbers of DLLs enrolled in American schools. Then, the chapter identifies gaps among previous studies and introduces the purpose of the current study. The chapter also discusses the significance of research that supports DLLs who are acquiring bilingual oral language skills and provides the importance of analyzing narratives of young, or preschool-age DLLs. The chapter then presents the significance of examining narratives in Chinese and Spanish, or children's heritage language (HL). Finally, it prepares readers by providing definitions of the key terms that are discussed throughout the study.

Background of the Problem

There has been a rapid and large increase of young DLLs in the United States (Park et al., 2017, 2018). DLLs are children under the age of eight who have at least one parent that speaks a language other than English at home (Park et al., 2017). The report of the U.S. Census Bureau, 2015-2019 showed that 11.2 million, or 33% of the children under age nine in the country were DLLs (Migration Policy Institute, National Center on Immigrant Integration Policy, 2021). In particular, 76% of all English learners in the United States spoke Spanish, and Chinese was the top third language spoken by K-12 English learners in the school year 2016-2017 (Holtby et al., 2017; U.S. Department of Education, 2019a). Across the nation, California has the largest

population of DLLs (Holtby et al., 2017) and Chinese speakers (U.S. Department of Education, 2019b). Hence, as there are large numbers of Chinese-English and Spanish-English DLLs in California, this study is geographically advantageous to assist the two largest DLL populations by providing informative study results on narrative skills in English and HL.

In the last two decades, there has been an increase in studies examining the language development of DLLs at varying ages. However, few studies have examined the oral language development of DLLs during the critical developmental years of early childhood (Hammer et al., 2014). Previous studies that have examined oral proficiency in DLLs have focused on vocabulary, grammar, listening comprehension, or phonological skills (e.g., Geva, 2006; Scarpino et al., 2019). However, researchers have suggested that examining children's narratives provides a means for systematically and thoroughly assessing their oral language skills (Lucero & Uchikoshi, 2019; Miller et al., 2006). There are various benefits to investigating oral language skills. Namely, narratives require skills to tell stories using multiple sentences organized thematically and sequentially (Peterson & McCabe, 1994). Narrative assessments have also been found to be developmentally appropriate for young children (Heilmann et al., 2010) because narratives provide a method for examining a variety of skills such as vocabulary and grammatical complexity as well as overall narrative quality (Paradis et al., 2011) from one set of data. Children as young as age three can tell narratives and they possess a sense of self, time, and spatial relations to describe storylines (Kao, 2014).

Moreover, it is important to examine young DLLs' narrative skills because previous studies have shown that narrative skills during the elementary years predict later reading achievement (Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018). For example, Uchikoshi and colleagues (2018) found that the narrative skills of DLLs who speak Chinese and Spanish in first grade predicted reading comprehension skills in second grade after controlling for the influence of decoding and vocabulary. Griffin et al. (2004) also highlighted that monolingual children's skills to describe pictures to a listener at age five predicted reading skills at age eight.

In order to understand the effect of oral language skills on reading comprehension skills, more studies need to examine the narrative skills of young children, between the ages of three and five, who have less experience receiving formal reading instruction compared to older children. This is especially important because oral language skills, or narrative skills may be an early precursor to later literacy (Dickinson et al., 2003; Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018), and having insight about early narrative skills may make a great impact in future literacy skills, like reading comprehension skills. Other studies emphasized that the thinking process for reading comprehension and narratives are similar (Curenton, 2011; Paris & Paris, 2003). Specifically, Paris and Paris (2003) highlighted the connection between reading comprehension and narratives because meaning making is based on cognitive skills to connect previous and new information regardless of pictures or texts. Both narrative and reading comprehension employ meaning making by using contextual clues and existing knowledge.

Purpose of the Study

The body of literature on narratives had been first established for English monolinguals (e.g., Bamberg & Damrad-Frye, 1991; Bliss et al., 1998; Eaton et al., 1999; Peterson & McCabe, 1994; Purcell-Gates, 1988), and more recently for Spanish-English DLLs (e.g., Bedore et al., 2010; Bitetti et al., 2020; Fiestas & Peña, 2004; Gutiérrez-Clellen, 2002; Lucero, 2018; Luo et al., 2014; Méndez et al., 2018; Simon-Cereijido & Gutiérrez-Clellen, 2009; Uccelli & Páez, 2007; Uchikoshi, 2005). However, in order to have a more comprehensive understanding of narrative skills in DLLs, more research needs to be conducted on DLLs with other language backgrounds, such as Chinese-English DLLs (Hao et al., 2019; Luo et al., 2014; Rezzonico et al., 2016; Yan et al., 2017). In fact, previous research suggests that narrative skills are associated with cultural backgrounds in that various cultures have unique approaches and habits in telling stories (Heath, 1982; Luo et al., 2014; Minami & McCabe, 1991; Wang & Leichtman, 2000). For example, Heath (1982) highlighted that literacy activity such as reading books before bedtime was a habitual activity for some communities in the United States, while it was not a habit for other communities even though they lived in the same country. The history of the community that children live in also largely influences their literacy habits. Literacy routines, activities, experiences, and attitudes towards literacy may differ depending upon cultures. Hence, multiple groups, such as DLLs from different cultures, should not be collapsed into one group when analyzing their narratives (Luo et al., 2014).

Furthermore, analysis in both English and HL is important since DLLs may present different developmental stages in each language (Gottardo & Mueller, 2009; Lucero, 2018). Thus, the purpose of this study was to explore young DLLs' narrative structure in both English and their HL. Specifically, the study focused on Chinese-English and Spanish-English DLL preschoolers between the ages of three and five, and employed a mixed-method approach. First, the study investigated more detailed linguistic skills, or microstructure as well as overall narrative quality, or macrostructure, in both English and HL. Similarities and differences in English narratives for the Chinese and Spanish groups were also examined by analyzing statistically significant differences in microstructure and macrostructure between the two language groups. Second, the study selected advanced and less advanced narratives in English from both the Chinese and Spanish groups, and then compared how these narrative qualities differ. Such qualitative analysis revealed how advanced and less advanced narratives differ in detailed narrative characteristics and how to better support children with less advanced narrative skills. Third, after investigating the relations among English and HL macrostructure and microstructure via Pearson correlation analysis, the study examined whether narrative macrostructure is language-specific or language-interdependent by employing multiple linear regression analysis.

Significance of the Study

The results of the study contribute to the field of early bilingual education in the following four ways: it provides information about early narratives as a precursor of later literacy

skills; it provides a comprehensive understanding of narrative skills in the two languages of DLLs; it compares narratives of the two largest DLL populations such as Chinese-English and Spanish-English DLLs; and it examines language interdependence of narrative skills.

First, the study sheds light on Chinese-English and Spanish-English DLLs' early narrative skills before they enter elementary school. As early narrative skills predict later literacy skills (Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018), it is important to explore narratives of children at this young age range before they are more experienced receiving formal literacy instruction. Second, as DLLs may make progress differently in each language, investigation of narratives in both English and HL is meaningful to fully understand their language skills (Gottardo & Mueller, 2009; Lucero, 2018). Because English is the instructional and societal language in the United States, most previous research has focused on only English for bilingual children. However, analysis of two languages provided a more comprehensive understanding of DLLs' language skills. Therefore, the study investigated the narrative skills of Chinese-English and Spanish-English DLLs in each language.

Third, studying the two largest DLL populations in the United States allows researchers to find similarities and differences in the narrative characteristics between the two diverse groups. They come from unique cultures and Chinese and Spanish are typologically distinct. Specifically, the Spanish language is typologically closer to English in that it uses an alphabetic system in which graphemes and phonemes relate, while Chinese uses a logographic system in which each character represents meanings (Martinez-Adrian & Gallardo-Del-Puerto, 2017;

Wang & Geva, 2003). Hence, the results from the study revealed both unique and common narrative characteristics for the two groups from distinct cultural and language backgrounds. Finally, the study investigated language-specific or language-interdependent skills between narratives in English and HL. It showed whether overall narrative skills could be shared between English and Chinese or English and Spanish after it is learned once.

The implications of this study aim to inform preschool and kindergarten curriculums as well as provide instructional recommendations for parents and educators about how they may help young DLLs to improve their narrative skills. Therefore, this study contributes to the existing literature by studying the young DLLs from the two largest immigrant populations in the nation (Park et al., 2017, 2018) together. In addition, because narrative skills contribute to their future academic success such as reading comprehension skills, the results from this study will assist young DLLs in strengthening their early narrative skills and in preparing a solid foundation for their later literacy skills.

Definition of Terms

The definitions of key terms used in this study are as follows.

- *Dual Language Learners (DLLs)*: Young children from birth to age eight who have at least one parent that speaks a language other than English at home (Michigan Policy Institute, National Center on Immigrant Integration Policy, 2021). Families with DLLs speak different languages, identify with various races and ethnicities from various countries, come from a range of socioeconomic statuses and educational levels, and hold

various migration histories (Park et al., 2018). In the United States, 62% of DLLs are Hispanic and 15% are Asian, and 65% of the DLL parents are immigrants; 40% are from Mexico, and 3% are from China (Park et al., 2018). DLLs are more likely to live in poverty in comparison to non-DLL children, and DLL parents are more likely to have lower educational levels than non-DLL parents (Park et al., 2018).

- *Heritage Language (HL)*: A language that DLLs and their families speak at home, or a home language. In this study, the heritage language is either Chinese (Cantonese or Mandarin) or Spanish, and English is a societal language. Among the DLL participants' parents, both parents identified themselves as Chinese American or Mexican American and spoke either Chinese or Spanish at home.
- *Narrative*: Narratives are also called discourse or oral language skills, and measure skills to tell stories by making sentences and organizing them thematically and sequentially (Peterson & McCabe, 1994). Child narrative studies typically utilize either narrative telling, in which children are given prompts like pictures and tell stories to listeners; or narrative retelling, in which children listen to the stories first, and then tell what they have listened to. This study employed narrative telling, and children were asked to tell stories to the listener who did not share the information on the storyline. The prompt used in this study was a wordless picture book.
- *Microstructure*: Microstructure refers to more detailed narrative skills such as lexical and grammatical productive skills within sentence levels (Bitetti & Hammer, 2016).

Traditional microstructure measures include mean length of utterance (MLU) at a morphological level as a grammatical indicator (Brown, 1973) and the current study followed Lucero's study (2015) which employed mean length utterance at the word level (MLUw). Number of different words (NDW) and number of total words (NTW) represent productive lexical diversity. In this study, subordinate index (SI) which shows grammatical complexity at a clause level (Miller et al., 2019) was not used to represent microstructure.

- *Number of Different Words (NDW)*: NDW is a microstructure measure, and it is an indicator of lexical complexity (e.g., Bitetti & Hammer, 2016; Lucero, 2015). It is a count of different words that were used within child narratives to measure how many unique words children produced. Utterances that included unintelligible words were not counted to calculate NDW (Miller et al., 2018).
- *Number of Total Words (NTW)*: NTW is also a microstructure measure, and it is an indicator of lexical complexity (e.g., Hao et al., 2019; Kunnari et al., 2016; Rodina, 2017). Different from NDW above, NTW counts repeated words within child narratives to measure how many words children produced. Utterances that included unintelligible words were not counted to calculate NTW (Miller et al., 2018).
- *Mean Length Utterance in word (MLUw)*: MLUw is also a microstructure measure, and it is an indicator of grammatical complexity (Bitetti & Hammer, 2016; Lucero, 2015). The total number of words was divided by the total number of complete and intelligible

utterances to calculate the average length of utterances (Bitetti et al., 2020). In this study, words were not divided into morphological pieces such as past tense "-ed" or third person singular "-s" in English to calculate this number. Utterances that included unintelligible words were not counted to calculate MLUw (Miller et al., 2018).

- *Macrostructure*: In comparison to microstructure, macrostructure refers to more global narrative quality beyond the utterance level. It refers to overall story organization, coherence, and the content within narratives (Bitetti et al., 2020), and it allows narrators to connect pieces of stories as a whole (Bitteti & Hammer, 2016). In this study, macrostructure was measured by adapting the event coding scheme by Luo et al. (2014).

Chapter II: Literature Review

Introduction

This section first introduces narratives by discussing how past studies have collected and examined narrative data. Then the section explains the benefit of narrative telling as a bilingual measure for young bilingual children in preschool. Then, two principal ways that narratives are analyzed such as microstructure and macrostructure are explained with defining aspects of the two. The theoretical framework of language interdependence, inconsistencies within the field, and the need for more narrative studies for young DLLs are then addressed. Finally, the review discusses the importance of exploring narratives of linguistically and culturally diverse groups.

Narrative

Child narratives are typically elicited by wordless picture books or video clips by having children view pictures or videos to verbally develop a storyline. Other studies also used prompts such as “Tell me about your last birthday party”, “Have you ever broken your arm?”, and “What happened?” by providing familiar topics and minimum response to elicit child speech within a natural form of discourse (Bliss et al., 1998; Purcell-Gates,1988). The narrative measure has been used for children aged between three and twelve (Berman, 1988; Bitetti & Hammer, 2016; Bitetti et al., 2020; Bohnacker, 2016; Bonifacci et al., 2018; Labov, 1972; Luo et al., 2014; Uchikoshi, 2005) and adults (Berman, 1988; Labov, 1972) for both monolinguals (Hipfner-Boucher et al., 2015; Reese et al., 2010) and bilinguals (Rezzonico et al., 2016; Roch et al., 2016). Narratives are appropriate for young children before kindergarten since children at age three can also tell stories although low levels of narrative skills might be observed for younger children (Berman, 1988; Peterson & McCabe, 1983). Because wordless materials provide visual aids for participants to tell stories without linguistic support, it is considered a good oral language measure (e.g., Bamberg & Damrad-Frye, 1991; Eaton et al., 1999; Luo et al., 2014, 2019; Rojas et al., 2016; Uchikoshi, 2005). Narratives may also be collected as story recall or retell tasks to examine listening comprehension and narrative skills (Gutièrrez-Cellen, 2002; Heilmann et al., 2010; Lucero 2015, 2018).

Bedore and colleagues (2010) emphasized that narrative is a valid linguistic measure because it captures information about academic language use such as discourse level organization, productivity, and sentence level organization. Specifically, discourse level

organizations look at whether a story as a whole is well-organized such that clauses are ordered in temporal sequence (Labov, 1972). Productivity looks at the number of total words (NTW) or number of different words (NDW) which presents the quantity of words narrators produced. Sentence level organization looks at whether sentences are grammatically organized. When telling stories, children are required to organize events to be understood by a listener (Bedore et al., 2010). Concurrently, narrators are also required to convey meanings at the sentence level. Thus, narratives challenge children cognitively because they produce more complex speech than routine conversations where they use short sentences without sequencing.

Narrative as an oral language measure gives children opportunities to freely construct stories, maximizing their knowledge. It is different from cloze questions in standardized tests because these questions require children to fill in blanks by providing limited correct answers. Narrative is also deemed as a robust measure for bilingual studies because they allow researchers to directly compare the data in English and another language such as Spanish (Lucero, 2015). Although languages like English and Chinese are typologically distinct, studies have also used microstructure measures like MLU differentials, or the MLU score differences at a time point to explore language dominance (Yip & Matthews, 2006). Though normed measures are validated for monolinguals and are often biased against DLLs who learn English and HL simultaneously, narratives can be used irrespective of their first and second language (Lucero, 2018).

Further, narratives are often analyzed at two structural levels: microstructure and macrostructure (e.g., Bitetti & Hammer, 2016; Bitetti et al., 2020; Bonifacci et al., 2018; Hao et

al., 2019; Heilmann et al., 2010; Lucero, 2015, 2018; Rodina, 2017; Uchikoshi, 2005). Microstructure involves more detailed linguistic components such as production, which includes number of vocabulary, length of utterances, and grammatical complexity. On the contrary, macrostructure involves higher-order organizations and examines the narrative as a whole such as story structure features, events, storybook language, and referencing (Lucero, 2018; Luo et al., 2014; Uchikoshi, 2005). Because microstructure gives information about words and grammar, and macrostructure gives an overview of the discourse, narrative analysis at both levels sheds light on relations among important oral skills that are predictive of early literacy development (Lucero, 2015).

Previous studies with Spanish-English bilinguals used both microstructure and macrostructure to examine kindergarteners' narratives (e.g., Heilmann et al., 2010; Lucero, 2015, 2018; Uchikoshi, 2005). An early study examined the microstructure and macrostructure of narratives of Spanish-English-speaking kindergarteners aged five (Uchikoshi, 2005). Her analysis included microstructure such as the number of words and mean clause length as well as macrostructure such as story structure features, events, storybook language, temporality, evaluations, and referencing. The results showed that microstructure and macrostructure were significantly correlated for Spanish-English bilinguals. In addition, Miller et al. (2006) indicated the significant relations among microstructure, macrostructure, and reading comprehension for Spanish-English bilingual children from kindergarten to third grade. Therefore, analysis of both

microstructure and macrostructure, as detailed below, provides meaningful information within child narratives relevant to important literacy skills like reading comprehension skills.

Microstructure

Microstructure centers on detailed linguistic aspects such as lexical and grammatical complexity of narratives (Bitetti & Hammer, 2016; Bonifacci et al., 2018; Heilmann et al., 2010). Exemplary measures of microstructure features include number of total words (NTW), number of different words (NDW), mean length utterance (MLU) in morphemes, mean length utterance in words (MLUw), and subordination index (SI) (Heilmann et al., 2010; Jacobson & Walden, 2013; Lucero, 2015, 2018). NTW and NDW are concerned about lexical complexity, or vocabulary size, and MLU, MLUw, and SI are concerned about grammatical complexity. Because NTW, NDW, MLU, MLUw, and SI indicate information about lexical and grammatical elements, which further relate to overall narrative quality, these aspects have been included in narrative analysis.

Specifically, NTW is considered a robust measure to represent productivity in that the number shows the amount of information presented in narratives (Heilmann et al., 2010). NDW has also been used in children's narrative studies to represent vocabulary and lexical complexity. NDW and NTW are distinct in that NDW counts only different words without giving credit to repeated words and inflections, or free morphemes (Bitetti & Hammer, 2016; Bitetti et al., 2020; Lucero, 2018; Méndez et al., 2018). Further, MLU and MLUw have been largely used to measure grammatical complexity of children's narratives because they are simple indexes of

grammar measured in sentence length; as such longer sentences indicate more knowledge (Brown, 1973). MLU typically indicates mean length utterance in morphemes such as prefix, root, and suffix. Thus, when calculating MLU, the total number of morphemes is divided by the number of utterances (Brown, 1973). An utterance is also called C-unit which includes a main clause and dependent clauses (MacWhinney, 2000). To calculate MLUw, the total number of words, without counting morphemes, is divided by the total number of complete and intelligible utterances (e.g., Bitetti et al., 2020). Finally, SI is another measure of grammatical complexity, or grammar proficiency. It is the ratio of the total number of clauses in narratives divided by the total number of utterances (Heilmann et al., 2010; Lucero, 2015). MLU, MLUw, and SI are measures of grammatical complexity, and MLU is at the morpheme level, MLUw is at the word level, and SI is at the clause level. Researchers consider NTW, NDW, MLU, MLUw, and SI as good cross-linguistic measures since these numbers can be directly compared across languages like English and Spanish (Bitetti & Hammer, 2016; Bitetti et al., 2020; Lucero, 2018). Unlike standardized tests that are often biased against bilingual children, narratives might more appropriately capture DLL's language skills without bias (Simon-Cereijido & Guterrez-Coellen, 2009). Importantly, lexical complexity and macrostructural measures measured by the narrative scoring scheme (NSS) showed a unique relationship, which further explained the importance of vocabulary in the narrative organization (Heilmann et al., 2010).

In addition, Labov (1972) also highlighted the development of syntactic complexity with three different age groups such as preadolescents (between the ages of nine and 13), adolescents

(between the ages of 14 and 19), and adults. When comparing the use of evaluative devices which involve more complex grammar, the adolescents used more evaluative devices than the preadolescents in various categories, and the adults used more evaluative devices than the adolescents. For example, the older groups used more comparators such as negatives to talk about an event that did not happen in the story in order to compare the actual event to hypothetical scenarios. The older groups also used correlatives such as progressive form, or "be -ing", and appended participles, or verb in -ing forms, to talk about events that occur simultaneously. These results show that narrators use more complex grammar as they advance in their narrative skills.

Macrostructure

While microstructure involves detailed linguistic aspects such as lexical and grammatical complexity at a sentence level, macrostructure examines overall narrative quality (e.g., Bitetti & Hammer, 2016; Bohnacker, 2016; Bonifacci et al., 2018; Heilman et al., 2010; Méndez et al., 2018; Rezzonico et al., 2016; Roch et al., 2016; Rodina, 2017). Within macrostructure, events that involve story sequences are one of the most important pieces of information to explore the overall quality of narratives. Events, or story structure, entail important aspects of narrative analysis because they examine the existence of story sequences required to construct a coherent and complete storyline. The previous studies analyzed common event components by checking the presence or absence of themes relevant to constructing a storyline (Heilmann et al., 2010; Labov & Waletzky, 1967; Labov, 1972; Luo et al., 2014; Peterson & McCabe, 1983; Uchikoshi,

2005; Umiker-Sebeok, 1979). For example, an introduction first opens up a story by providing a general location that is surrounding the characters and some details about the setting such as the time of the day or a season (Heilmann et al., 2010). Character orientation then sets the stage by introducing the main characters. Then, problems or events arise and require the narrator to move a story forward (Labov, 1972). Following problems, a resolution solves the prior issues. Finally, a clear conclusion statement wraps up and ends the story (Labov, 1972).

To describe a storyline from symbolic children's books, each event feature discussed above links and completes the entire story. Investigating the relations between these events, Berman (1988) noted that most monolingual children between the ages of three and four focus on each event separately, while adults and children between five and seven can connect each event. Peterson and McCabe (1983) further underscored that narratives from monolingual children under the age of five lack chronological organization, and they end stories with the highest point rather than closing or concluding events. Many monolingual children can finally construct well-structured stories at age six. Hence, analyses of events are important because such assessment gives information on the quality of narratives, or the existence of elements necessary in telling stories.

In addition to events that describe small story components, there are other tools to build a complete narrative. Namely, character labeling, or character delineation describes main and supporting characters in detail and distinguishes their roles (Heilman et al., 2010; Pinto et al., 2015, 2019; Schneider et al., 2005; Uchikoshi, 2005). Characters should also be introduced and

then appropriate pronouns should be used consistently. In order to maintain cohesiveness in narratives, children also use temporal expressions, or temporality to organize events in chronological order (Uchikoshi, 2005). Temporality checks for conjunctive cohesion for narrators to maintain logical expression of time such as which event happened prior to other events by using expressions like “and” (Heilman et al., 2010). It also checks for logical connection of events by using expressions like “but” and “finally”.

Further, direct and indirect quotes or character speech are also significant because quotes are one way for a speaker to separate herself from characters to describe events (Bamberg & Damrad-Frye, 1991). Third-person narratives report the experiences of somebody who is not a speaker, while first-person narratives, or personal narratives, describe the speaker's direct experiences (Bamberg & Damrad-Frye, 1991; Tager-Flusberg, 1995). Because stories elicited from wordless picture books are not the events that children have first-hand experience, it is appropriate to use direct or indirect quotes to speak as a story character or a narrator. Hence, by evaluating the mention of direct or indirect quotes, whether or not children adopt a different stance to describe a character's feelings or thoughts can be revealed. Overall, events, character labeling, temporality, and direct or indirect quotes check for the quality of information children provide in their narratives.

In addition to the events saliently described in pictures, young children as young as age three can exhibit characters’ thoughts and feelings (Chang, 2004). Evaluative clauses that reference characters’ emotions also play an important role in connecting story sequences

(Bamberg & Damrad-Frye, 1991; Labov & Waletzky, 1967). Referencing character emotions also advance with age as shown in the comparison of frames of mind like “sad”, “happy”, and “scared” used among three different age groups: five, nine, and adults (Bamberg & Damrad-Frye, 1991). As children grow older and gain more advanced language skills, they have skills to note more emotions. Further, evaluative clauses may include reasons for the situations and consequences (Bamberg & Damrad-Frye, 1991), as well as defeats of expectations that are not overtly observed (Chang, 2004; Uchikoshi, 2005). Since reasons and expectations are not overt information, mention of these requires more cognitive skills.

Following the monolingual studies (Berman, 1988; Eaton et al., 1999; Peterson & McCabe, 1983), several bilingual studies investigated macrostructure for bilinguals at age four (Bonifacci et al., 2018; Bitetti et al., 2020), ages four to six (Fiestas & Peña, 2004), ages five to six (Heilmann et al., 2010), ages seven to eight (Gutiérrez-Clellen, 2002), and ages four to nine (Hao et al., 2019). For example, Hipfner-Boucher et al. (2015) showed no group differences in macrostructure for monolinguals and bilinguals who spoke various languages. Further, Bonifacci et al. (2018) exhibited no group differences in macrostructure such as goal, outcome, and mental states for Italian monolinguals and bilinguals with various language backgrounds. However, the bilinguals in this study produced fewer features about the setting and characters’ attempts. As discussed above, investigation of macrostructure is appropriate for both monolinguals and bilinguals including young children.

Macrostructure as Language-Specific or Language-Interdependent Skills

Since bilingual narrative studies show conflicting results and young DLLs are developing their oral language skills in two languages, it is crucial to understand how the two narratives in English and HL are related. Specifically, there have been inconsistent results on whether macrostructure is language-interdependent (Bohnacker, 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013) or language-specific (Bitetti et al., 2020; Kang, 2012; Kapalková et al., 2016). The interdependence hypothesis, or dual-iceberg hypothesis (Cummins, 1981) proposes that every language has two layers; the surface layer is the obvious language-specific differences such as pronunciation, grammar, and basic vocabulary, while the bottom layer is a general knowledge commonly found in various languages such as cognitive, academic, and communication language proficiency. The interdependence hypothesis (Cummins, 1981) further divides the linguistic knowledge into basic interpersonal communicative skills (BICS) and cognitive or academic language proficiency (CALP), and only CALP can be transferred to another language once it is learned in one language. As CALP includes literacy skills, examining early narratives allows researchers to test the interdependence hypothesis by testing the association between the macrostructure of the stories narrated in two languages (Rezzonico et al., 2016).

Exploring the interdependence hypothesis (Cummins, 1981), previous studies conducted with bilingual children have shown mixed results concerning the relations between the macrostructure in their two languages. Several studies showed that macrostructure is associated across languages for Spanish-English-speaking children age five (Méndez et al., 2018),

Cantonese-English-speaking children ages four and five (Rezzonico et al., 2016), Norwegian-Russian-speaking children age four (Rodina, 2017), Swedish-English-speaking children ages five to seven (Bohnacker, 2016), and Russian-Hebrew-speaking children age three (Schwartz & Shaul, 2013). In addition, Kunnari et al. (2016) showed no statistical differences between macrostructure in two languages for Finnish-Swedish-speaking children ages five to six, suggesting that the children performed similarly in their two languages. Different from other studies, Rezzonico et al. (2016) found a cross-linguistic effect where Cantonese microstructure predicted English microstructure. As well, Cantonese macrostructure predicted English macrostructure even after including Cantonese microstructure in the regression models for Cantonese-English-speaking children ages four and five.

On the contrary, Kapalková et al. (2016) showed significant differences between macrostructure across languages for Slovak-English-speaking children age five by applying paired-samples *t*-tests. As Slovak was the participants' L1, they showed stronger Slovak macrostructure than their English macrostructure. Other studies also did not show cross-linguistic relations between macrostructure in two languages for Spanish-English-speaking children age four (Bitetti et al., 2020) and for Korean-English-speaking children age six (Kang, 2012) after controlling for microstructure within the same language. For example, Kang (2012) found statistically significant correlations between Korean and English narrative quality measures. However, Korean macrostructure did not predict English macrostructure in hierarchical regression models, after controlling for English microstructure. Though there were

no significant differences in macrostructure in the two languages, narrative quality in macrostructure was not transferred across languages. Hence, Kang (2012) did not support the interdependence hypothesis (Cummins, 1981) in macrostructure when controlling for within-language microstructure.

Moreover, Bitetti and colleagues (2020) found that Spanish macrostructure alone predicted English macrostructure. However, when English microstructure, as measured with NTW, NDW, MLUw, and SI, were included in the multiple regression model, Spanish macrostructure lost its predictive power of English macrostructure. This supports the strong relation between within-language microstructure and macrostructure seen in previous studies (e.g., Bohnacker, 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013). For instance, Heilmann et al. (2010) highlighted strong correlations between microstructure and macrostructure in English for Spanish-English bilingual children between the ages of five and seven. Méndez et al. (2018) also supported the relationship between microstructure and macrostructure in Spanish and English with Spanish-English bilingual children aged five. Further, Rodina (2017) also showed marginally significant correlations between narrative production and MLU in Russian, but not in Norwegian, for simultaneous Norwegian-Russian bilinguals aged four. This suggests that within-language relations may change depending on participants' language proficiency level or typological distance between the two languages of bilinguals.

Whether or not macrostructure is language-independent is an inconsistency that calls for further research. Furthermore, whether macrostructure is language-dependent after controlling for within language microstructure was tested in a few combinations of languages such as Spanish and English (Bitetti et al., 2020), Korean and English (Kang, 2012), and Cantonese and English (Rezzonico et al., 2016) for children ages four to six. Therefore, more research needs to investigate the interdependence of macrostructure with young bilinguals who speak languages that are typologically distant like Chinese and Spanish.

Narratives in English and Heritage Language for Diverse Groups

To conduct a study with children who speak two languages, investigation of both English and HL is essential as they may present different levels of skills in each language (Gottardo & Mueller, 2009; Lucero, 2018). Past studies on bilingual narratives looked at narratives in two languages (e.g., Heilmann et al., 2010; Lucero, 2015, 2018), but they were limited to one language group like Spanish-speaking groups rather than analyzing groups with different language and cultural backgrounds. Importantly, communication and interaction around books and narrative skills are associated with children's cultural backgrounds (Heath, 1982; Peterson et al., 1999). Different cultures may have various storytelling styles based on their values and beliefs (Luo et al., 2014; Rezzonico et al., 2016; Silva & McCabe, 1996). Evidentially, several studies have found differences in storytelling between American, Chinese, Mexican children and families (Luo et al., 2013, 2014; Silva & McCabe, 1996; Smith & Johnson, 2019; Streit et al., 2018; Wang & Leichtman, 2000). A summary of Chinese parental views (Luo et al., 2013)

informed that Chinese parents practice parenting based on Confucianism. For example, Chinese parents particularly promote goals for children such as gaining knowledge, social norms, modesty of success, shame of failure, self-restraint, filial piety, and harmonious relationships. The parents also emphasize that their children should achieve academic success (Luo et al., 2013). A study of narrative skills also denoted that Chinese mothers tend to emphasize negative consequences in a story, and Mexican mothers tend to emphasize emotions, internal states, or states of characters more than Chinese mothers did (Luo et al., 2014). Furthermore, when comparing kindergartners in China and the United States, Wang and Leichtman (2000) found that Chinese children's narratives included greater concern with authority, more emotional expressions, and situational details compared to American children's narratives. However, by comparing preschoolers from ethnically diverse groups such as African American, Dominican, Mexican, and Chinese, Luo et al. (2014) did not find any differences in children's reference to negative consequences and emotions.

Although Chinese culture emphasizes harmonious relationships, Mexican culture also seems to center on family harmony such as keeping family relationships with siblings and relatives as well as being obligated to share with family members (Streit et al., 2018). Silva and McCabe (1996) underscored that Mexican children's narratives tend to center on personal and familial matters and descriptions of appearance of objects, while they de-emphasize event sequencing. Moreover, Smith and Johnson (2019) showed that Mexican parental perspectives on children's education placed a strong value on unity and collective understanding, which oppose

individual achievement of American values. The study added that Mexican parents value respect for elders, group membership, and community involvement. These studies evidently showed that cultural values and storytelling styles differ per culture.

Little research has looked at the narrative structure for Chinese-English and Spanish-English DLLs between the ages of three and five years together (Luo et al., 2014). As they are the two of the largest DLL populations in the United States (Park et al., 2017, 2018), investigating narratives of the two language groups will elucidate whether they show similarities or differences in their narratives. Simultaneous analysis of diverse groups provided information on how children from various linguistic backgrounds perform and reveal what types of instructional support they may need (Luo et al., 2014).

Goals of the Dissertation Study

Narratives are identified as a prominent assessment of academic success and school readiness for both young monolinguals (e.g., Bamberg & Damrad-Frye, 1991; Berman, 1988; Eaton et al., 1999) and bilinguals (Luo et al., 2014; Rojas et al., 2016; Uchikoshi, 2005) at ages as young as three. Narratives alone allow researchers to analyze children's detailed linguistic skills (microstructure) as well as overall language ability to organize stories (macrostructure). Different from employing standardized tests normed for monolingual children, this dissertation analyzes narrative data that children were allowed to speak freely to test whether macrostructure in English and HL are interdependent, as well as examines bilingual children's oral language proficiency. Given that more numbers of past bilingual narrative studies exhibited language

interdependence of only macrostructure in English and HL (Bohnacker, 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013), the current study did not investigate the interdependence of microstructure across languages. Rather, the focus of the study was whether or not macrostructure is language interdependent after controlling for within language microstructure.

Further, since early childhood is a crucial time to prepare for academic success, this dissertation focused on the oral language skills of two groups of DLLs enrolled in Head Start preschool programs: Chinese-English and Spanish-English DLLs. As DLLs learn English and HL concurrently, their language development was investigated in both languages (Gottardo & Mueller, 2009; Lucero, 2018) to better understand their bilingual narratives and whether there are differences between their two languages. Such investigation of early bilingual language skills shed light on DLLs' comprehensive oral language proficiency.

As the number of young DLLs increases (Park et al., 2017, 2018), bilingualism and bilingual education in the nation need to be better supported, especially in narratives because skills to tell stories are precursors to future literacy, or academic skills (Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018). The current study has unique implications for the classroom as well as for homes because it examines whether macrostructure in the two languages are related for Chinese-English and Spanish-English DLLs between the ages of three and five. In addition, it investigated whether HL macrostructure predicts English macrostructure after controlling for English microstructure. Investigation of language interdependence matters to

educators and parents of DLLs because children may need to learn certain skills in one language and then apply such skills to another language. Hence, educators and parents could teach certain skills once as well as highlight the transfer of skills across languages.

Increasing Chinese and Mexican immigrant populations coming to the United States has meant that Spanish has become the most spoken foreign language in the country, with Chinese following as the third most spoken non-English language (Holtby et al., 2017; U.S. Department of Education, 2019a). Chinese- and Spanish-speaking children come from two different cultures and their parents may emphasize different parts of stories because family and cultural values may differ between the two groups and these values may influence children's narrative characteristics (Luo et al., 2014). Because cultural values and habits differ for various groups (Heath, 1982; Luo et al., 2013; Smith & Johnson, 2019; Streit et al., 2018; Wang & Leichtman, 2000), children from each group may show similarities or differences in their narratives learned from their families and cultures. Hence, analyzing children's narratives in English and HL in these two largest immigrant populations in the United States is crucial to reveal both unique and common instructional support for their academic success.

Chapter III: Research Design & Methods

Introduction and Research Questions

This study employed a mixed-method design to investigate the three research questions below. The study first investigated the overall and detailed narrative quality of young Chinese-English and Spanish-English DLLs by employing descriptive statistics. Then the selected data

were analyzed qualitatively to compare the narrative characteristics of advanced and less advanced groups. Furthermore, Pearson correlations were used to examine the relationships among all variables, such as microstructure and macrostructure in both English and HL. To investigate the cross-linguistic relations between narratives in English and Chinese or Spanish, four regression models were built.

This section presents the research questions, hypotheses, research methodology, such as the population and the sample of the data, data collection procedures, and data processing. The data processing included transcribing, action transcribing, verification, macrostructure coding, and microstructure calculation, presented with their reliability measures. Finally, an analytic method for each research question was explained using specific data. The methodology in this chapter was used to answer the three research questions below:

1. What are the similarities and differences between narratives of Chinese-English and Spanish-English DLL preschoolers in English and Chinese or Spanish?
2. What features are present in English narratives of Chinese-English and Spanish-English DLLs who demonstrate advanced macrostructure compared to the English narratives of those who have less advanced macrostructure?
3. Is English macrostructure predicted by Chinese or Spanish macrostructure for Chinese-English and Spanish-English DLL preschoolers after controlling for within-language microstructure?

In terms of the first question, since the current participants were approximately a year younger than the participants of Luo et al. (2014), who used the same wordless picture book with ethnically diverse children, the average event component scores were hypothesized as lower than

4.75 points for the Chinese group and 4.45 points for the Spanish group. There was no hypothesis relevant to the microstructure and HL narratives since Luo et al. (2014) did not investigate the microstructure and narratives in HL.

Because the previous studies showed significant correlations among microstructure measures within languages (Bitetti et al., 2020; Heilmann et al., 2010; Kang, 2012; Lucero, 2015, 2018; Méndez et al., 2018), the study hypothesized that some variables in English, Chinese, or Spanish independently may be significantly correlated. These previous studies used narrative scoring scheme (NSS) and showed statistically significant correlations among all macrostructure and microstructure measures; NTW, NDW, and MLUw within language (Bitetti et al., 2020; Heilmann et al., 2010) or NDW and MLUw (Lucero, 2018). However, Méndez et al. (2018) showed significant correlations between English NSS and English NDW only. Hence, it is possible that some microstructure measures such as NTW and MLUw may not correlate with macrostructure within the same language.

Regarding correlations between microstructure and macrostructure across languages, it was hypothesized that only some but not all microstructure variables would be correlated with macrostructure (Bitetti et al., 2020; Kang, 2012; Lucero, 2018). Specifically, Lucero (2018) showed no statistically significant correlations between Spanish macrostructure and English MLUw. Kang (2012) also did not show statistically significant correlations between English macrostructure and Korean vocabulary, number of clauses, and type-token ratio. Moreover, Bitetti et al. (2020) showed statistically significant correlations of all Spanish microstructure variables and English macrostructure for the balanced language group, but no statistically significant correlations between Spanish microstructure and English macrostructure for the Spanish dominant group.

In terms of the second research question, since narratives of monolingual children under the age of five lack chronological organization and end stories with the highest point without touching upon the conclusion (Peterson & McCabe, 1983), narratives may present such characteristics. Further, Children as young as age three exhibit characters' thoughts and feelings (Chang, 2004), and narrators have skills to note more emotions as they gain more advanced language skills (Bamberg & Damrad-Frye, 1991). For these reasons, mention of feelings and emotions may be observed for more advanced narratives. As described in Uchikoshi (2005), advanced narrators may connect several sentences and discuss more event components to move the story forward. Finally, since narrative advancement showed more use of evaluative clauses, advanced narratives may present reasons for the situations and consequences (Bamberg & Damrad-Frye, 1991).

In terms of the third research question, thus far, more studies have supported Cummins' (1981) interdependence hypothesis in many combinations of languages such as Spanish and English (Méndez et al., 2018), Cantonese and English (Rezzonico et al., 2016), Swedish and English (Bohnacker, 2016), Finnish and Swedish (Kunnari et al., 2016), Norwegian and Russian (Rodina, 2017), and Russian and Hebrew (Schwartz & Shaul, 2013). On the contrary, Bitetti et al. (2020) and Kang (2012) did not support the interdependence hypothesis after controlling for within-language microstructure for Spanish-English and Korean-English bilinguals respectively. Therefore, it was hypothesized that the results would be in line with the majority of the studies showing cross-linguistic relations of macrostructure in Models 1 and 3 which included HL macrostructure and age as predictor variables and English macrostructure as the outcome variable. However, it was hypothesized that macrostructure may be language interdependent after controlling for within-language microstructure for Chinese-English DLLs (Rezzonico et al.,

2016) in Model 2 which included English microstructure, while it is not the same for Spanish-English DLLs (Bitetti et al., 2020) in Model 4 which also included English microstructure.

Population and Sample

The data in the study came from a larger project on DLL children's language and socio-emotional development collected between 2018 and 2020 in person at the children's homes. First, parents of Chinese-English and Spanish-English DLLs enrolled in Head Start programs in urban and suburban areas in Northern California were recruited during parent meetings or given a flier at drop-off and pick-up times. The children's teachers were also given the flier (See appendix G) to help with the recruitment, and the flier indicated information such as the purpose of the project, time commitment, and monetary compensation; It was available in English, Spanish, and both simplified and traditional Chinese so that participants' parents were well-informed. The research sites were selected because the Head Start centers in the area had high populations of Chinese-English and Spanish-English DLLs to recruit the target DLL populations. In order to recruit typically developing DLLs, the recruitment team made sure that the children were able to speak a two-word phrase in their HL by age three and had not been previously identified as having a neurodevelopmental disorder. The additional criteria for inclusion in the study were that they belonged to a Head Start program at the time of data collection, and their home language was either Chinese (Cantonese or Mandarin) or Spanish.

It is important to note that the HL was spoken at home and children had opportunities to be exposed to HL. Also, both parents of each child identified themselves as Mexican American or Chinese American. The children from both groups were financially eligible for Head Start

programs and shared similar low socioeconomic status. The phone screening was conducted in the parents' preferred language so that parents were not burdened by translation services (Hsin et al., 2022b), and that they could establish trust with the research assistants who were proficient in their languages.

After the phone screening to confirm eligibility for the study, consent forms (see Appendix H) were obtained from the participants, and the data were collected throughout the academic year 2018-2019 and 2019-2020 in person before the pandemic. The participants included 77 Chinese-English DLLs (34 girls and 43 boys) and 48 Spanish-English DLLs (30 girls and 18 boys). The age ranged between 36 and 60 months (M = 49, SD = 7.70) for the Chinese group and between 36 and 63 months (M = 48.95, SD = 6.72) for the Spanish group. The data set includes 125 English narratives, 48 Spanish narratives, and 77 Chinese narratives (62 Cantonese and 15 Mandarin). Originally, there were 123 Chinese-English and 66 Spanish-English DLLs in the study. Of these, only the children who had narrative data in both languages were included in the study, and there was no missing narrative data. Specifically, children who spoke even one utterance relevant to the book content were included in the study. The data from 46 Chinese-English and 18 Spanish-English DLLs, who either did not have the narrative data in the two languages or who did not speak a word in the target language during the narrative task were excluded.

Because of the recruitment criteria that they spoke Chinese or Spanish at home, the HL was mostly DLL's primary language except for the time they spent in the Head Start programs. Their language exposure data were also collected through the survey by asking about the hours that their parents spoke (input) in English or HL on a typical weekday and a weekend day as well

as the hours that the children spoke (output) on those days (Gutiérrez-Clellen & Kreiter, 2003). Then, to calculate their language input and output, hours for weekdays were multiplied by five and the hours on weekends were multiplied by two. For instance, in order to calculate the English input value, the total English input hours were divided by the total input hours. The Chinese group had a complete data set on language input and output, but the information of three children was missing for the Spanish group.

As shown in Table 1, the Chinese and Spanish groups were similar in their age, language input and output of both English and HL; however, the Chinese group's English and HL expressive raw vocabulary scores measured by the *Woodcock-Johnson, 4th Edition, Tests of Oral Language* (Schrank et al., 2014) were significantly higher than those of the Spanish group. Raw scores were used because the standardized scores, which convert raw scores to be comparable for participants in the same age ranges, were not available in Chinese. To test Chinese expressive vocabulary, the Spanish version of the test was adapted as has been done in past studies (Chernoff et al., 2021; Chung et al., 2019; Uchikoshi, 2013; Uchikoshi et al., 2022). While there were no statistically significant parental age differences across the two language groups, the Chinese parents showed significantly higher years of education than the parents of the Spanish group. Specifically, on average, the Chinese parents had education above high school which was closer to an associate's degree, while the parents of the Spanish group had above high school education which was closer to some high school education. Of all DLLs, 86% of the Chinese-English DLLs and 85% of the Spanish-English DLLs were born in the United States. There was some missing data as indicated by the numbers for each variable in Table 1.

Table 1

Descriptive Statistics of Demographic Information and Expressive Vocabulary

	Chinese-English DLLs					Spanish-English DLLs					
Variable	*N*	*M (SD)*	Range	Skew ness	Kurtosis	*N*	*M (SD)*	Range	Skew ness	Kurtosis	*t*-test
Child Age in Months	77	49 (7.70)	36-60	-.17	1.66	48	48.95 (6.72)	36-63	-.08	2.03	ns
Child Input English	77	40.44 (17.11)	11-84	.12	2.66	45	39.60 (21.13)	0-87	.22	2.65	ns
Child Input HL	77	59.56 (17.11)	16-89	-.12	2.66	45	60.44 (21.15)	1-100	-.22	2.65	ns
Child Output English	77	44.18 (19.73)	3-100	.17	3.04	45	47.33 (26.75)	0-100	.43	2.60	ns
Child Output HL	77	55.82 (19.73)	0-97	-.17	3.04	45	50.47 (26.91)	0-100	-.47	2.47	ns
Raw HL Vocab	77	12.01 (6.47)	1-23	-.16	1.80	48	9.60 (6.57)	0-22	.36	1.87	-2.00*
Raw English Vocab	77	13.70 (5.44)	2-28	.02	2.72	48	11.73 (5.56)	3-22	.01	1.82	-1.95*
Stand English Vocab	77	82.95 (17.38)	40-127	.10	3.00	48	75.67 (19.30)	40-118	-.14	2.24	-2.13*
Parental Age	60	37.52 (5.33)	28-52	.34	2.62	44	36.04 (6.61)	24-53	.18	2.51	ns
Parental Edu	77	3.70 (1.33)	1-7	-.15	3.08	45	3.02 (1.43)	(1-6)	.15	2.18	-2.59**
	N		*Percentage*			*N*		*Percentage*			
Child U.S. Born	77		86%			43		85%			

Note. HL = heritage language, Child Input = parents speaking to the children in percentile, Child Output = children speaking in percentile, Vocab = expressive vocabulary, Stand = standard, Parental Edu = parental education: 1 = less than high school, 2 = some high school, 3 = high school graduate, GED, 4 = technical school, vocational school,

certification, some college, associate's degree, 5 = Bachelor's degree, 6 = Master's degree, 7 = Doctorate degree (JD, MD, PhD), ns = not significant, *$p < .05$, **$p < .01$.

Data Collection

Narratives were collected during a home visit by three trained bilingual research assistants following the previous studies with young children (Chang, 2004; Luo et al., 2014; Peterson & McCabe, 1994). Research assistants were undergraduate or graduate students from two research universities. All participants were screened during the first data collection day about their dominant language and the data collection began in the language the children were more comfortable with. The first bilingual research assistant spoke to the children in only one language so that the target language was consistently spoken throughout data collection. If children switched a language, the research assistant asked them to go back to the same language to elicit narratives in the target language. This first assistant recorded the audio of this entire process. Then, the second assistant video-recorded the same scene without speaking to the child. The third assistant interviewed the parents in a separate room. A home visit took place either during the morning or afternoon hours when the families requested. There were no procedural differences between the Chinese and Spanish groups.

Narrative Data Collection

Narrative data in English and HL were collected using the wordless picture book, *Hug* (Alborough, 2002). The book has previously been used in research on narratives with children from diverse backgrounds including Chinese-speaking and Spanish-speaking children (e.g., Luo et al., 2014; Melzi & Caspe, 2005). Unlike other wordless picture books, this book did contain three words throughout the story (*HUG, BOBO, MOMMY*) in the tested language, but there were

no sentences. The story described a baby monkey, or chimpanzee, who goes on an adventure searching for the mother. He encounters seven types of animals hugging their families or friends. At the end of the story, the monkey finds the mother in support of other animals, and they all hug.

First, the assistant showed the book by opening it page by page and demonstrated that this book had no sentences like other typical books. Then, the assistant asked "Can you tell me a story?" to the participants. To elicit maximum narrative production from the participants, the assistant provided limited verbal support such as "Tell me what happens on this page?" or "Anything else?", and merely encouraged them to speak with no time limit (Luo et al., 2014). As noted, the children were both audio- and video-recorded during the narrative tasks.

Narrative Data Processing

First, trained research assistants listened to the audio recordings using earphones and transcribed narratives. The assistants had high proficiency in either Cantonese, Mandarin, or Spanish as well as English. They were trained using the identical training materials to ensure the same transcribing procedure and consistency in transcription. In the first transcribing procedure, all transcribers used a transcription system called the *Child Language Data Exchange System* (*CHILDES*; MacWhinney, 2000). It is a transcribing system for interactions and conversations which organizes utterances in a standardized format to be analyzed in language research. Precisely, words that are spelled differently such as "ok" and "okay" were spelled consistently based on the shared spelling dictionary so these words are identified as the same words in analyses. Fillers that did not play a communicative meaning were marked so they were not counted in the analysis.

Second, action transcribers watched the video data and added visual information after the initial transcription. Namely, they added visual information such as children nodding, pointing to the pictures, shaking of heads, and leaning to capture any physical information that can help the following analysis. Such information frequently served communication purposes, so they helped later macrostructure coders judge the purposes of the utterances. The action transcribers also added page numbers of the book to help the following coding of the macrostructure to match the narratives to the book content as young children's narratives can be ambiguous and they may skip pages. This process helped macrostructure coders because the page number provided information on which page children intended to talk about with pronouns. The action transcribers also added utterances that the initial transcripts missed because they could sometimes read participants' facial expressions and lips. This process improved the completeness of the transcripts.

Finally, the third trained assistant verified the transcripts to correct any errors by listening to the same audio that the first transcriber used to transcribe and reviewed the transcripts line by line. The verifiers were further trained to correct any errors that the first transcriber made. When there were ambiguous utterances and disagreements, the verifier and the transcriber communicated to reach a consensus. The verifiers also confirmed with other verifiers if they identified anything ambiguous. The purpose of the verification process was to make sure that the transcripts captured all the information as well as to verify that the information on the transcripts was accurate. In addition to checking the contents of the transcripts, verifiers also processed the transcript content in the CLANc program (MacWhinney, 2000) to make sure that there were no computation problems. Namely, verifiers ran the check command to make sure that the

transcripts were formatted in the conventional way to be analyzed by the program correctly. The verifiers ran the command and corrected every error until the data were error-free. They also ran the frequency command to view the list of words spoken by the children to make sure that spelling was correct and consistent for all words across participants.

Data Analysis

Any utterances with code-switches were excluded in the microstructure and macrostructure analysis to examine the two languages separately by following the previous studies (Lucero, 2018; Rezzonico et al., 2016). Of all children, 14% of the Chinese group and 25% of the Spanish group showed utterances with code-switching from English to their HL.

Microstructure Calculation

The CLANc program (MacWhinney, 2000) computed microstructure measures such as number of total words (NTW), number of different words (NDW), and mean length utterance in words (MLUw) (Heilmann et al., 2010; Jacobson & Walden, 2013; Lucero, 2015, 2018; Uchikoshi, 2005) using child utterances without any unintelligible words. The three numbers computed by the program were adjusted by dropping inflections in English and Spanish (Bedore et al., 2010; Bittetti et al., 2020; Lucero, 2015, 2018; Méndez et al., 2018; Rojas et al., 2016), but not in Chinese. Since Chinese lacks grammatical morphemes like the progressive "-ing" in English, the Chinese data were segmented at a word-level consistently following the segmentation method of Hao et al. (2019). The segmentation of Cantonese and Mandarin were the same. Then, microstructure measures of English and Spanish were adjusted because the transcripts had been completed in a way that morphosyntactic analysis was not computed by the CLANc automatically. Because the MOR program of the CLANc that analyzes morphosyntax

within words was not used, some types of morphological pieces had been excluded manually by the Spanish coder and the researcher. For example, English inflections such as possessive "-s", plural "-s", verb present tense third person "-s", and verb regular past "-d" or "-ed" were excluded from the count by looking at the word list of the frequency analysis and MLU analysis of the CLANc.

Macrostructure Coding

The macrostructure was coded by one Cantonese-speaking research assistant who was also highly proficient in Mandarin, one Spanish-speaking research assistant, and the researcher. All three coders had high language proficiency to analyze the target language data. Twenty percent of the English data was coded (Bitetti et al., 2020; Rezzonico et al., 2016) by three coders to achieve reliability since it was the common language for all coders. Namely, 30 English files were coded by all three coders, and Fleiss kappa was .76 which confirmed adequate reliability (Kline, 2015). After meeting the reliability, the Chinese-speaking assistant coded all Chinese data, the Spanish-speaking assistant coded all Spanish data, and the researcher coded all English data independently.

For narrative coding of macrostructure, the transcripts were coded primarily using the narrative coding scheme adapted from Luo et al. (2014). Namely, narratives were coded based on the macrostructure of events as shown in the table in Appendix A. For the event section, the study adapted the event coding scheme called *"HUG" Child Storytelling Narrative Coherence Coding* by Luo et al. (2014) for two reasons. The first reason is that her study used the same wordless picture book, *HUG* (Alborough, 2002), with demographically diverse children such as

Chinese and Mexican children aged five. Therefore, the events in the current data match the components from this study.

Second, the coding scheme in Luo et al. (2014) contained a majority of the story structure features that have been used in other research on early narratives such as an opening or introduction, setting orientation, character delineation, problems, resolutions, and a conclusion (Bamberg & Damrad-Frye, 1991; Heilmann et al., 2010; Labov and Waletzky, 1967; Peterson & McCabe, 1983; Uchikoshi, 2005). The coding scheme also included the character's thoughts and feelings (Bamberg & Damrad-Frye,1991; Chang, 2004; Uchikoshi, 2005). The table in Appendix A presents a summary of eight event components with 33 points from Luo et al. (2014).

Events. There are eight event components; the opening, the monkey is looking at other animals hugging, the monkey is sad, the elephants are helping the monkey, the monkey is seeing other animals hugging, the monkey is crying and being comforted by other animals, the monkey reunites with the mother, and the closing. To support the eight event components, there are also a total of 33 small sequences describing detailed events that move the story forward. Within 33 sequences, children's skills to describe unobserved features such as character's intention or emotions and give meaning to the events as a narrator were assessed. Inclusion of this feature was important because it measured whether children included devices that connect overt event sequences (Bamberg & Damrad-Frye,1991). Heilman et al., (2010) also underscored the examination of mental states such as children's skills to describe character's thoughts and feelings.

Because the primary focus of the coding was not grammatical accuracy, children were credited as long as ideas in their narratives contained the key terms. For example, grammatical

errors such as “monkey walking” rather than “monkey is walking” was given credit for macrostructure because the ideas carried in the two sentences were the same. Similarly, the pictures of leopards may have looked like a tiger or a lion. Some children may have called chimpanzees monkeys. In the case that children used animals that were similar to the correct animals, children were given credit to focus on the story components, not their accuracy in vocabulary.

Additional Coding. In addition to the event coding scheme of Luo et al. (2014), the current study coded for animals, character labeling (Pinto et al., 2015, 2019; Schneider et al., 2005), temporality, direct or indirect quotes (Uchikoshi, 2005), and location words that also contribute to overall narrative quality. Reviewing the event coding in the data from the participants, the emerging results showed that children were speaking, but not scoring in event components in Luo et al. (2014) due to short and incomplete sentences. Hence, these additional coding were further analyzed to elucidate children’s narrative quality that did not only result in scores in event components. These categories are explained below as well as in the table in Appendix B.

Animals. This category was adapted from character development from narrative scoring scheme (Heilman et al., 2010) and labeling from Stadler and Ward (2005). Because early narratives include nominal labeling without grammaticality, whether they mentioned the animals regardless of verb use was analyzed. Although names of animals could be categorized as vocabulary skills, since the book, *Hug* (Alborough, 2002), included seven different animals such as monkeys, elephants, lizards, snakes, lions, giraffes, and hippopotamuses, mention of animals were analyzed in relation to character development. In this book, the main characters were the

baby monkey and the elephants, and other characters also helped move the story forward. Because young children may also have used the words like “animals” and “zoo animals” to refer to the group of animals, the use of these words was also given a point which makes a total eight points in mentioning animals. It’s important to note that children were only credited for the use of animals for the first time only. As in the macrostructure coding, children were also credited if they mentioned similar types of animals such as monkeys, gorillas, and chimpanzees. Hence, the scoring ranged between 0-8 showing the numbers of animals and the animal group as a whole they noted.

Character Labeling. This coding adapted character delineation (Heilman et al., 2010; Uchikoshi, 2005) and checked whether children differentiated character roles. Character labeling was different from mentioning the character when it first appeared. Rather, it described different character roles such as main and supporting characters and highlighted the differences between each character such as mommy and a baby. Because children may have chosen certain characters and discussed their relationships, this category was crucial in constructing narratives. For example, if they mentioned any roles like a brother, sister, or friends, they were credited only once. The score in this category ranged between 0-1 showing whether or not they described character roles.

Temporality. Children often use temporal expressions to organize events in chronological order (Uchikoshi, 2005). Temporality analyzed the existence of features that support narrative cohesions such as the mention of expressions like “and” or “and then” to connect event sequences to make a chronological and coherent storyline (Heilman et al., 2010). For example, if a child said “Elephants took the monkey and then helped him”, the child was given a point

because the statement connected two events and it also showed a logical order of events which contributed to overall narrative quality. For this category, the score ranged between 0-1 showing whether or not they connected events or actions.

Direct or Indirect Quotes. As noted previously, quotes allow speakers to separate themselves from characters to describe scenes (Bamberg & Damrad-Frye, 1991). Children also change their voices to describe speech from different characters. This section assessed children's understanding of unique language usage of books as opposed to typical conversation language. For example, if a child said, "He told the elephant that he is lost." or "'*C*an you tell me where my mommy is?', he said.", the child was given a point as it showed indirect or direct quotes. For this category, the score ranged between 0-1.

Location Words. This categorization was added to examine whether children mentioned the location of characters and scenes because the changes in scenes and locations helped them move the story forward. For example, "The mommy is on the tree." was given one point because it described when the baby monkey and other animals found his parent. Unlike the previous studies which checked for the setting of introductions (Heilmann et al., 2010), this category could appear anywhere in the events since the location where characters appear changed throughout the story. For this category, the score ranged between 0-1 showing whether they mentioned the place where characters appear or not.

Analytic Method

To answer the first research question, "What are the similarities and differences between narratives of Chinese-English and Spanish-English DLL preschoolers in English and Chinese or Spanish?", the macrostructure and microstructure scores were summarized. Specifically,

descriptive statistics (mean, standard deviation, range, skewness, kurtosis, and Welch's *t*-test) of these scores were computed using the statistical software *Stata version15* (StataCorp., 2017). A Welch's *t*-test was conducted because the sample size of the two groups was unbalanced as there were 77 Chinese-English and 48 Spanish-English DLLs (Ruxton, 2006). Due to the small sample size, statistical power needed to be saved. For this reason, a correction of *p* values for multiple comparisons were not applied in order to capture important findings about the similarities or differences among groups (Rothman, 1990). The scores from microstructure, macrostructure, and the additional categories such as animal names and total scores were continuous variables, while the scores of other additional categories such as character labeling, temporality, quotes, and location words were dichotomous variables. For the macrostructure, I analyzed the distributions of the total scores from the eight event components with 33 sequences (Heilmann et al., 2010; Lucero, 2018; Luo et al., 2014) as well as additional categories such as animals, character labeling, temporality, direct and indirect quotes, location words, and the total score of these categories.

At the microstructure level, I analyzed NTW for productivity, NDW for vocabulary and lexical complexity, and MLUw for grammatical complexity of children's narratives. SI was not used in this study since narratives from the current participants did not have much grammatical complexity at a clause level. Identical to the analysis of macrostructure, descriptive statistics of NTW, NDW, and MLUw were computed following the previous studies to explore what skills exist in participants' narratives (e.g., Chang, 2004; Lucero, 2018; Uchikoshi, 2005).

Then, the mean scores of English macrostructure and microstructure from the two groups were compared. The mean scores of HL macrostructure from the two groups were also

compared; however, the HL microstructure scores were not compared since Chinese and Spanish are typologically different languages and comparison of the HL would not give useful information to understand their narrative development. The mean scores of additional categories were analyzed the same way that English macrostructure and microstructure were compared.

To answer the second research question, "What features are present in English narratives of Chinese-English and Spanish-English DLLs who demonstrate advanced macrostructure compared to the English narratives of those who have less advanced macrostructure?", I selected the English narrative data from children who showed more advanced quality and from children who showed less advanced quality in giving the story. Specifically, narratives of children whose English macrostructure scores were high (12-21 points) and low (no score) were selected. Overall, the advanced group noted six or seven event components out of eight events, and the less advanced group did not score in macrostructure although they spoke. In order to fully understand how children presented narratives, utterances with unintelligible words were included in this analysis. Following the example of Lucero (2018) and Uchikoshi (2005), some example quotes will be presented in the result section to show what narrative characteristics were included or missing.

To answer the third research question "Is English macrostructure predicted by Chinese or Spanish macrostructure for Chinese-English and Spanish-English DLL preschoolers after controlling for within-language microstructure?", I first used the Pearson correlations of all microstructure and macrostructure across English and Chinese or Spanish to explore how microstructure and macrostructure across language correlate with each other (Bitetti et al., 2020; Hao, 2019; Heilmann et al., 2010; Kang, 2012; Lucero, 2015, 2018; Méndez et al., 2018;

Rezzonico et al., 2016; Rodina, 2017). Specifically, the correlation of the macrostructure; the sum of eight event components with 33 sequences, and all microstructure; NTW, NDW, and MLUw in English and HL were computed to examine whether the scores present shared variance in constructing narratives. This process was necessary in order to check for multicollinearity, or a phenomenon in which two or more predictor variables are highly correlated (Glen, 2015) since multicollinearity may obscure significant effects of predictors in the later regression models, and it may cause misinterpretation of the results in the later analysis (Kline, 2015). Because the correlation and regression analyses separated the Chinese and Spanish groups, the correction of *p* values were not applied (Rothman, 1990).

Following the correlation analysis, two cross-linguistic multiple linear regression models per language group were built. Because the participants had a large age range (Chinese-English DLLs: 36-61 months, Spanish: 36-63 months), age was controlled for in both groups following the previous studies (Bitetti et al., 2020; Rezzonico et al., 2016). In addition, Luo et al. (2014) highlighted the effects of sex on storytelling for young DLLs since her results showed that girls referred to more story components than the boys did. Hence, whether group differences existed by sex was analyzed using the *t*-test on expressive vocabulary scores to determine if sex as a control variable should be included in later regression models. The purpose for including age and sex was to isolate the effects of the two from the relationship between the focus variables such as macrostructure and microstructure. In other words, it was to investigate the associations between macrostructure and microstructure while holding children's age and sex constant. The inclusion of sex will be discussed in the result section.

The first regression models (Models 1 and 3) examined the contribution of HL macrostructure on English macrostructure since macrostructure in L1 predicted macrostructure in the second language in previous studies (Bitetti et al., 2020; Kang, 2012; Rezzonico et al, 2016). As noted, the current participants came from families whose home language was Chinese or Spanish. Hence, their HL was set as their L1 in statistical models. Due to the large age differences, age was added as a control variable for both groups. Because Bitetti et al. (2020) showed no influence of language dominance in the relations among cross-linguistic macrostructure, the study did not separate the participants by language dominance to maintain the sample sizes to prevent issues relevant to small sample sizes (Kline, 2015). Hence, Models 1 and 3 consisted of HL macrostructure and age as predictor variable and English macrostructure as the outcome variable. The control variable of sex was added accordingly per language group.

In Kang (2012) and Bitetti et al. (2020), the relation between macrostructure across languages changed after controlling for within-language microstructure. For this reason, the study examined if the relationship of macrostructure will remain significant after including English microstructure in the model. In Models 2 and 4, English microstructure was added to Model 1 and 3. Namely, HL macrostructure and English microstructure predicted English macrostructure. Regarding the microstructure measures, the study selected one measure between English NTW or NDW which showed higher correlations with the English macrostructure since they both indicate lexical complexity. The two models also included English MLUw which indicates grammatical complexity. Hence, Models 2 and 4 consisted of HL macrostructure and English MLUw, English NTW or NDW, and age as predictor variables, and English

macrostructure as the outcome variable. The control variables of sex were added accordingly per language group.

Conclusion of Research Design & Methods

This chapter presented the three research questions, hypotheses, the population and the data sample and data collection, multiple steps in narrative data processing such as transcribing, action transcribing, verification, microstructure calculation, and macrostructure coding with reliability measures. The way that descriptive statistics of microstructure and macrostructure answer the research questions were explained. The section on qualitative analysis provided information on how advanced and less advanced narrative analysis would answer the second research question. Then, the section on the correlation analysis described selection of variables to be included in the regression analysis. The section on multiple linear regression analysis explained the rationale for investigating cross-linguistic relations of macrostructure in the two languages. It further explained the examination of cross-linguistic relations of macrostructure with extended models which controlled for within-language microstructure. The robust data sets yielded significant results which lead to a comprehensive understanding of narratives by young Chinese-English and Spanish-English DLLs. The following section presents the results of the three research questions.

Chapter IV: Results

Introduction

As noted, all data were collected from 77 Chinese-English and 48 Spanish-English DLLs without any missing narrative data. First, descriptive statistics of macrostructure and

microstructure for both English and HL data were analyzed to evaluate whether the data were normally distributed and to prepare for the following analysis. In order to see the statistically significant differences between the Chinese and Spanish groups, Welch's *t*-tests were run for English macrostructure, HL macrostructure, and English microstructure. Additional characteristics that were different from the event component (Luo et al., 2014) were also analyzed to review characteristics that did not result in macrostructure scores. Second, advanced and less advanced English narratives were qualitatively analyzed to elucidate what skills children present. Then, Pearson correlation analysis was run to evaluate the relations among variables and to determine the variable to include in the following regression models. Finally, two multiple linear regression models were built for each language group.

Findings of Research Question 1

To answer the first question, "What are the similarities and differences between narratives of Chinese-English and Spanish-English DLL preschoolers in English and Chinese or Spanish?", the distributions of the variables in Table 2 were analyzed in histograms (See appendix C and D). Based on the visual inspection of the histograms of all variables in Table 2 for the Chinese group, both English and Chinese macrostructure were right-skewed, showing that the majority of the children were on the lower end of the distribution. Similarly, all English microstructure measures (NTW, NDW, MLUw) of the Chinese group were right-skewed, showing that the majority of the children were on the lower end of the distribution. For Chinese microstructure, MLUw was normally distributed, but NTW and NDW were right-skewed. An outlier which scored the highest, or 149 in HL NDW, was identified for the Chinese group. All variables were within acceptable distance values for skewness and kurtosis such that skewness

was less than the absolute value of three and the kurtosis was less than the absolute value of 10 (Kline, 2015).

Table 2

Descriptive Statistics of English and HL Macrostructure and Microstructure

	Chinese-English DLLs				Spanish-English DLLS				
Variable	*M (SD)*	*Range*	*Skewness*	*Kurtosis*	*M (SD)*	*Range*	*Skewness*	*Kurtosis*	*t-test*
English Macrostructure	5.25 (5.36)	0-21	.97	3.08	5.92 (5.86)	0-21	.57	2.05	ns
HL Macrostructure	3.52 (4.04)	0-17	1.29	4.04	4.69 (4.67)	0-16	.75	2.73	ns
English NTW	129.77 (97.48)	1-393	.80	2.76	122.31 (100.08)	7-426	1.13	3.88	ns
HL NTW	95.29 (107.28)	0-542	1.98	7.27	73 (68.05)	0-238	.83	2.73	-
English NDW	42.65 (28.58)	1-108	.64	2.61	41.81 (29.67)	3-119	.63	2.51	ns
HL NDW	34.01 (30.79)	0-149	1.48	5.18	27.49 (21.85)	0-78	.38	2.06	-
English MLUw	2.44 (1.09)	1-5.90	.85	3.40	2.90 (1.50)	1-8.14	1.40	5.22	ns
HL MLUw	2.37 (1.10)	0-5.59	.73	3.25	2.56 (1.50)	0-5.84	.41	2.59	-

Note. Macrostructure = Total 33 points in event components, HL = heritage language, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, ns = not significant.

For the Spanish group, both English and Spanish macrostructure scores were right-skewed, showing the majority of the children were on the lower end of the distribution (See appendix E and F). Similarly, all English microstructure measures (NTW, NDW, MLUw) of the Spanish group were right-skewed, showing that the majority of the children were on the lower end of the distribution. Similar to the Chinese group, the Spanish group's Spanish MLUw was normally distributed, but NTW and NDW were right-skewed as their English microstructure. An

outlier which scored the highest, or 8.14 in English MLUw, was identified for the Spanish group. All variables were within acceptable distance values for skewness and kurtosis (Kline, 2015). The data showed large values of standard deviations, and the histograms showed skewness and kurtosis showing abnormal distributions. Hence, log transformation was applied for the skewed variables (Curran-Everett, 2018) for both the Chinese and Spanish groups to prepare for the following regression analysis since the regression analysis is based on the assumption that the data are normally distributed.

The results from the descriptive statistics showed that English macrostructure ranged between 0 and 21 (M = 5.25, SD = 5.36) for the Chinese group and between 0 and 21 (M = 5.92, SD = 5.86) for the Spanish group, as shown in Table 2. English NTW ranged between 1 and 393 (M = 129.77, SD = 97.48) for the Chinese group and between 7 and 426 (M = 122.31, SD = 100.08) for the Spanish group. English NDW ranged between 1 and 108 (M = 42.65, SD = 28.58) for the Chinese group and between 3 and 119 (M = 41.81, SD = 29.67) for the Spanish group. Finally, English MLUw ranged between 1 and 5.90 (M = 2.44 , SD = 1.09) for the Chinese group and between 1 and 8.14 (M = 2.90, SD = 1.50) for the Spanish group. As noted, the standard deviation values were higher than the means for some variables such as English macrostructure, HL macrostructure, and HL NTW for the Chinese group and it was unobserved for the Spanish group. Other standard deviation values were also high although they did not exceed the means of the same variables. These high standard deviation values may indicate high variation between values and abnormal distribution of the data as in the visual inspection of the histograms of all variables. It is important to note that the ranges of both microstructure and macrostructure are large, and there were children with no score. In terms of macrostructure, a

score of 0 indicates that children did not mention any event components that move the story forward. In terms of microstructure, they spoke during the data collection. However, their utterances included unintelligible words, so the CLANc program (MacWhinney, 2000) excluded these utterances to calculator microstructure measures such as NTW, NDW, and MLUw as has been done in other studies (e.g., Miller et al., 2018).

In addition to microstructure and macrostructure measures, all participants' narratives were further analyzed based on whether or not they mentioned the additional characteristics listed in the analytic method such as animals, character labeling, temporality, direct and indirect quotes, location words, and the total score of these categories as in the table in Appendix B. As noted, these categories were analyzed to elucidate children's narrative quality that did not result in scores in event components that make up a macrostructure score.

As in Table 3, the Spanish-English DLLs used more temporality (M = .60, SD = .49) than the Chinese-English DLLs (M = .39, SD = .49) and the two groups were significantly different (t(101.27) = -2.37, p = .02). There were no statistically significant differences in other categories such as animals, character labeling, direct and indirect quotes, location words, and the total score of these five categories. The results from the descriptive statistics showed that the category of animals ranged between 0 and 8 (M = 4.18, SD = 2.26) for the Chinese group and between 0 and 8 (M = 3.38, SD = 2.42) for the Spanish group. Character labeling ranged between 0 and 1 (M = .84, SD = .37) for the Chinese group and between 0 and 1 (M = .75, SD = .44) for the Spanish group. Temporality ranged between 0 and 1 (M = .39, SD = .49) for the Chinese group and between 0 and 1 (M = .60, SD = .49) for the Spanish group. Location words ranged between 0 and 1 (M = .51 , SD = .50) for the Chinese group and between 0 and 1 (M = .42, SD = .50) for the Spanish group. Finally, the total of all five additional categories ranged between 1

and 12 (M = 6.34 , SD = 3.00) for the Chinese group and between 0 and 12 (M = 5.52, SD = 3.37) for the Spanish group. The category of animals ranged between 0 and 8 since there were seven different animals and the expression to call animals as a whole as in "animals" or "zoo". Character labeling, temporality, quotes, and location words ranged between 0 and 1 because these categories checked whether children mentioned each category once within their narratives. All variables were within acceptable distance values for skewness and kurtosis (Kline, 2015).

Table 3

Descriptive Statistics of Additional Categories in English

	Chinese-English DLLs				Spanish-English DLLs				
Variable	*M (SD)*	Range	Skewness	Kurtosis	*M (SD)*	Range	Skewness	Kurtosis	*t*-test
Animals	4.18 (2.26)	0-8	-.08	1.91	3.38 (2.42)	0-8	.44	2.05	ns
Character labeling	.84 (.37)	0-1	-1.90	4.60	.75 (.44)	0-1	-1.15	2.33	ns
Temporality	.39 (.49)	0-1	.45	1.20	.60 (.49)	0-1	-.43	1.18	-2.37*
Quotes	.42 (.57)	0-1	.98	2.95	.38 (.49)	0-1	.52	1.27	ns
Location words	.51 (.50)	0-1	-.03	1.00	.42 (.50)	0-1	.34	1.11	ns
Total	6.34 (3.00)	1-12	-.03	2.15	5.52 (3.37)	0-12	.18	1.86	ns

Note. Quotes = direct and indirect quotes, ns = not significant,*$p < .05$.

Overall, the data showed no statistically significant differences in English and HL macrostructure and English microstructure variables for the two language groups. As noted in the

analytic method section, no correction of *p* values for multiple comparison[1] was applied in order to capture important findings about the group differences (Rothman, 1990).

Findings of Research Question 2

To answer the second question, "What features are present in English narratives of Chinese-English and Spanish-English DLLs who demonstrate advanced macrostructure compared to the English narratives of those who have less advanced macrostructure?", I chose the English narrative data from 12 Chinese-English DLLs who showed advanced quality and from 17 children who showed less advanced quality based on the English macrostructure. For the Spanish group, I chose the English narrative data from 13 Spanish-English DLLs who showed more advanced quality and from 13 children who showed less advanced quality. Specifically, all children in the less advanced group scored 0, and the more advanced group's macrostructure ranged between 12 and 21 points. In the advanced groups, all children who scored between 12 and 21 points were included.

As the analytic method demonstrated, all children in the advanced groups scored in six or seven event components out of eight events. Specifically, the majority of the children above score 12 talked about the introductory event of the elephants hugging, the event where the monkey is sad without anybody to hug, the event where other animals like the lions are hugging each other, the climactic event where the monkey cries, the resolution where the mommy finds the baby monkey, and the closing of monkey going home. As shown in Table 4, all variables were within acceptable distance values for skewness and kurtosis (Kline, 2015). The advanced and less advanced Chinese groups were significantly different in macrostructure and all

[1] When applying the Bonferroni correction method which controls for Type I error rate, the group difference in the temporality was insignificant.

microstructure measures such as English NTW, NDW, and MLUw. The advanced and less advanced Spanish groups were also significantly different in macrostructure and microstructure measures such as English NTW, NDW, and MLUw. In terms of age, the advanced and less advanced groups of both Chinese and Spanish were significantly different, showing that advanced groups were approximately 10 months older than the less advanced groups. The advanced Chinese group had four boys and seven girls and the less advanced Chinese group had 11 boys and six girls. The advanced Spanish group had two boys and 11 girls and the less advanced Spanish group had seven boys and six girls.

Table 4

Descriptive Statistics of Macrostructure and Microstructure for Advanced and Less Advanced Groups

	Advanced Chinese Group (N = 12)				Less Advanced Chinese Group (N = 17)				
Variable	*M (SD)*	Range	Skewness	Kurtosis	*M (SD)*	Range	Skewness	Kurtosis	*t*-test
English Macrostructure	15.08 (2.78)	12-21	.79	2.65	0 (0)	0-0	-	-	18.81***
English NTW	242 (92)	111-393	-.07	1.80	54.47 (49.05)	1-178	1.08	3.60	6.44***
English NDW	70.58 (20.05)	39-102	.14	2.01	15.59 (12.66)	1-52	1.36	4.98	8.39***
English MLUw	3.96 (1.11)	2.19-5.91	-.10	2.28	1.43 (.58)	1-3.24	1.96	6.50	7.22***
Child Age in Months	54.5 (6.71)	37-60	-1.54	4.82	44.18 (7.24)	36-60	.86	2.82	3.95***
	Advanced Spanish Group (N = 13)				Less Advanced Spanish Group (N = 13)				
Variable	*M (SD)*	Range	Skewness	Kurtosis	*M (SD)*	Range	Skewness	Kurtosis	*t*-test
English Macrostructure	13.85 (2.34)	12-21	2.39	7.98	0 (0)	0-0	-	-	9.10***

English NTW	222.54 (109.26)	82-426	.40	2.28	41.23 (39.57)	7-134	1.09	3.16	5.63***
English NDW	68.00 (27.93)	28-119	.22	2.03	12.62 (8.87)	3-31	.97	2.65	6.80***
English MLUw	4.60 (1.58)	2.83-8.14	.95	3.18	1.77 (.59)	1-2.74	.35	1.66	6.04***
Child Age in Months	54.31 (5.22)	45-63	-.32	2.35	44.31 (6.69)	36-55	.54	1.79	4.25***

Note. Macrostructure = Total 33 points in event components, HL = heritage language, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, ns = not significant, ****p < .001*.

Iterative review of advanced and less advanced narratives revealed their differences in four characteristics such as syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intention. First, all children from the advanced groups in the two language groups built syntactically more complex sentences. Though some sentences were ungrammatical, the children in the advanced groups spoke in complete sentences to describe which character accomplished certain actions. These sentences described the agent of the verb and the verb clearly. The following quotes from the narratives in this study are written in the format following the CHILDES guideline (MacWhinney, 2000) except for the translations of Chinese and Spanish utterances below the English utterances.

(1) she's screaming! (advanced Chinese ID 21149)

(2) and <there is> [/] there is a monkey. (advanced Chinese ID 21109)

(3) she really miss her daddy. (advanced Chinese ID 21041)

(4) the daddy elephant was &-um hugging the baby elephant. (advanced Spanish ID 11140)

(5) he was crying because they didn't give him a hug. (advanced Spanish ID 12008)

On the contrary, 94% of the less advanced Chinese group and 92% of the less advanced Spanish group listed animals such as “a monkey”, “elephant”, or “the snake” and did not connect these animals to verbs as the advanced narratives showed. They independently used verbs as in “just walk” or “go down”, without a subject. These verbs did not lead to macrostructure scores because the agent of the verb was unclear. Some children only counted numbers to express numbers of animals in the pictures; however, because they did not construct a sentence with clear action and its agent, these utterances did not result in scoring.

In addition, 100% from the advanced Chinese group and 92% of the advanced Spanish group used connectors such as “and” or “and then” to connect sequences of scenes and actions (Bohnacker, 2016; Uchikoshi, 2005). These connectors showed children’s understanding of which events happened prior to the other events, and supported narrative coherence. In contrast, 41% from less advanced Chinese group and 23% of the less advanced Spanish group used connectors. Of these cases where children used connectors, they were mostly used to connect nouns.

(6) then the monkey keep crying. (advanced Chinese ID 21095)

(7) and then she baby is [/] is happy. and a lot of animal see her mom. (advanced Chinese ID 21166)

(8) and then the monkey went to the snake. (advanced Chinese ID 21162)

(9) and then the baby monkey screamed to these animals. (advanced Spanish ID 11140)

(10) animal said what happened? and the monkey said +"/. +" I lost my family. (advanced Spanish ID 12036)

(11) xxx elephant and monkey! and then monkey and elephant! (less advanced Chinese ID 21046)

(12) and elephant. and (.) lion. (less advanced Chinese ID 21164)

(13) giraffe. and elephant. (less advanced Chinese ID 21013)

(14) elefante@s and monkey and elefante@s. (less advanced Spanish ID 11040)

elephant and monkey and elephants.

(15) [- spa] mi ama aqui. [- spa] y a paso. (less advanced Spanish ID 11095)

my love here. and a step.

Second, 100% of the advanced groups in the two language groups distinguished the characters, or character labeling, such as daddy, mommy, little one, or a baby (Pinto et al., 2015, 2019; Schneider et al., 2005). They also distinguished the same type of animals that appear on the same pages using the words like “another”. On the contrary, 47% of the less advanced Chinese group and 23% of the less advanced Spanish group described characters. One child from the less advanced Chinese group mixed the two languages and said “monkey 爸爸” to describe the monkey dad. One child from the less advanced Spanish group used Spanish to describe the baby.

(16) another monkey. (advanced Chinese ID 21198)

(17) then mommy hug the baby monkey. (advanced Chinese ID 21261)

(18) and the other monkey and baby is going to rescue dad [?]. (advanced Spanish ID 11077)

(19) &-um the elephant is hugging <the little> [/] the little elephant. (advanced Spanish ID 11112)

(20) and the big daddy was hugging the tiger. (advanced Spanish ID 12074)

(21) mommy [?]. daddy [?]. (less advanced Chinese ID 21069)

(22) mommy elephant. (less advanced Chinese ID 21084)

(23) daddy. (less advanced Chinese ID 21029)

(24) mom and daddy. (less advanced Spanish ID 12022)

(25) [- spa] esto es del bebé. (less advanced Spanish ID 11288)

this is of the baby.

Third, 75% of the advanced Chinese group and 62% of the advanced Spanish group used direct or indirect quotes, or character speech, to move the story forward (Bamberg & Damrad-Frye, 1991). As previously noted, direct and indirect quotes, or conversations among characters, allow speakers to separate themselves from the characters to describe events (Bamberg & Damrad-Frye, 1991). The children in both of the less advanced groups did not use quotes to express character speech in English. Unlike the children who gave advanced narratives, they spoke as themselves, not the characters in the book. One child from the less advanced Spanish group used quotes in Spanish.

(26) and then she daddy said let's go home. (advanced Chinese ID 21166)

(27) then everyone say +"/. +" hug. (advanced Chinese ID 21261)

(28) and then she say +"/. +" I want my mommy. (advanced Spanish ID 11018)

(29) and he said +"/. +" mommy [/] mommy you're back! (advanced Spanish ID 12008)

(30) +" why are you sad? +" (be)cause no one wanted to play with me he said. (advanced Spanish ID 11112)

(31) +" [- spa] <dónde está mi> [?] mamá? (less advanced Spanish ID 11288)

+" <where is my> [?] mom?

Fourth, 67% of the advanced Chinese group and 36% of the advanced Spanish group captured covert emotions of love from the action of hugging (Bamberg & Damrad-Frye, 1991; Chang, 2004; Uchikoshi, 2005). More numbers of children in the Chinese advanced group noted love than the children in the Spanish advanced group. Although no words or hints that describe love were given, they were able to discuss the characters' emotions of love from family relationships or their actions within the pictures.

(32) but he love the elephant. (advanced Chinese ID 21109)

(33) he want love. (advanced Chinese ID 21149)

(34) her love her baby. (advanced Chinese ID 21102)

(35) *they hug (be)cause he loves his mom.* (advanced Spanish ID 11112)

(36) he love him, he love him too. (advanced Spanish ID 11084)

In terms of other emotions, 75% of the advanced Chinese group and 62% of the advanced Spanish group noted the emotion of happiness. In addition, 83% of the Chinese group and 85% of the Spanish group noted the emotion of sadness. Thus, the Chinese and Spanish advanced groups were similar in that more than 60% of the children discussed happiness and sadness.

(37) and them is so happy. (advanced Chinese ID 21102)

(38) <and then> [/] <and then> [/] and then all the animal is happy. (advanced Chinese ID 21162)

(39) <lot of animal> [/] lot of animal is so sad. (advanced Chinese ID 21166)

(40) and he's happy. (advanced Spanish ID 11084)

(41) now they are super happy. (advanced Spanish ID 12014)

(42) the little monkey's sad. (advanced Spanish ID 12008)

On the contrary, only one child from the less advanced Spanish group said “happy” and “sad” without describing which character was feeling these emotions. While the pictures depicted characters’ feelings in facial expressions, body language, and actions, the majority of the children in less advanced groups did not express such emotions. Similarly, only one child from the less advanced Chinese group and one child from the Spanish group highlighted overt actions like crying and screaming. Of these, the child from the Spanish group pretended to be crying, but he did not mention who was crying.

Further, 50% of the advanced Chinese group and 54% of the advanced Spanish group described the intentions of actions or reasons for actions and contextual information (Uchikoshi, 2005). Of these children who provided reasons for actions, some children clearly explained the reasoning in a logical way using “because”, and the others touched upon the reasoning in a vague or illogical way. No child from the less advanced groups used intentions or actions.

(43) and then he's going to see his mother over there. (advanced Chinese ID 21095)

(44) he’s crying. because her want her mom. (advanced Chinese ID 21102)

(45) her [/] <her is> [/] her is not happy because her can't see her. (advanced Chinese ID 21092)

(46) he wants to hug him. (advanced Spanish ID 12036)

(47) they wanted to go home (be)cause they were tired. (advanced Spanish ID 11112)

(48) they were going to hug. (advanced Spanish ID 11140)

Finally, the previous studies noted the importance of an introduction and the character orientation which opens up a story and set the stage (Bamberg & Damrad-Frye, 1991; Heilmann et al., 2010; Labov & Waletzky, 1967; Luo et al., 2014; Peterson & McCabe, 1983; Uchikoshi, 2005). However, no child from the advanced Chinese group and only 15% of the advanced Spanish group included a clear introduction as below. Expectedly, no child from the less advanced group noted the introduction and character orientation. Although the start of the book showed a monkey walking in a forest by himself, many children from the advanced group started the story from the event where other animals were hugging their family members and the monkey was looking at them.

(49) one day there was a monkey. (advanced Spanish ID 11208)

(50) and one day xxx xxx monkeys say +"/. +" I want my mommy. (advanced Spanish ID 11018)

In sum, narratives from the advanced group showed four characteristics such as syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions. Specifically, syntactic complexity allowed narrators to clearly describe who accomplished certain actions in the scene, and the sequencing of actions also connects small event pieces. Character labeling introduced the key characters in each event which helped narrators to move the story forward. Direct and indirect quotes also allowed narrators to switch character roles and present characters' statements that moved the story forward. Further, the use of character emotions and intentions allowed children to explain in-depth information of the

story, as well as to make more advanced connections among the story components. By using these four characteristics, the children presented more advanced quality narratives.

Unlike advanced narrators, the majority of the children in less advanced groups, or 76% from the Chinese and 100% from the Spanish groups, spoke unintelligible utterances or utterances with unintelligible words although these utterances were not analyzed in the microstructure and macrostructure coding. Further, though it was difficult to determine from the transcripts, 29% of the less advanced Chinese and 100% of the Spanish groups included explanations that were astray from the intended topic or storylines, or possibly did not understand the storyline from the prompt. Of these children, some may have been unwilling to tell the story as they repeated "I don't know" throughout the narrative session.

Finally, two children from the less advanced Spanish group described the event components correctly in Spanish; however, these utterances did not lead to scores because only utterances in the target language were coded for macrostructure. Such a case was not observed for the Chinese-English DLLs. In sum, the less advanced narratives did not present syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions.

Findings of Research Question 3

To answer the third question, "Is English macrostructure predicted by Chinese or Spanish macrostructure for Chinese-English and Spanish-English DLL preschoolers after controlling for within-language microstructure?", I examined the relations among English and Chinese macrostructure and microstructure as shown in Table 5. Overall, both within language and cross-

linguistic correlations were found for the Chinese group. Specifically, English NTW, NDW, and MLUw showed positive and significant association to English macrostructure respectively, $r(75) = .64$, $p < .05$, $r(75) = .69$, $p < .05$, and $r(75) = .75$, $p < .05$. As expected, English NTW and NDW, English MLUw and NTW, and English NDW and MLUw showed significant and positive correlations respectively, $r(75) = .93$, $p < .05$, $r(75) = .66$, $p < .05$, and $r(75) = .71$, $p < .05$. The correlation between English NTW and NDW were particularly high indicating that they both measured lexical diversity.

Similarly, Chinese NTW, NDW, and MLUw showed positive and significant association to the Chinese macrostructure respectively, $r(75) = .69$, $p < .05$, $r(75) = .70$, $p < .05$, and $r(75) = .73$, $p < .05$. As expected, Chinese NTW and NDW, Chinese NTW and MLUw, and Chinese NDW and MLUw showed significant and positive correlations respectively, $r(75) = .95$, $p < .05$, $r(75) = .72$, $p < .05$, and $r(75) = .74$, $p < .05$. Similar to English, the correlations between Chinese NTW and NDW were high. Although cross-linguistic correlations were smaller than within-language correlations, all variables were significantly correlated. Specifically, English and Chinese macrostructure showed positive and significant associations. Chinese macrostructure showed positive and significant association with English NTW, NDW, and MLUw respectively, $r(75) = .34$, $p < .05$, $r(75) = .31$, $p < .05$, and $r(75) = .40$, $p < .05$. Chinese NTW showed positive and significant association with English NTW, NDW, and MLUw respectively, $r(75) = .38$, $p < .05$, $r(75) = .34$, $p < .05$, and $r(75) = .37$, $p < .05$. Chinese NDW showed positive and significant association with English NTW, NDW, and MLUw respectively, $r(75) = .33$, $p < .05$, $r(75) = .32$, $p < .05$, and $r(75) = .32$, $p < .05$. Finally, Chinese MLUw showed positive and significant association with English NTW, NDW, and MLUw respectively, $r(75) = .38$, $p < .05$, $r(75) = .36$, $p < .05$, and $r(75) = .52$, $p < .05$.

Table 5

Correlation of English and Chinese Macrostructure and Microstructure

Variable	1	2	3	4	5	6	7	8
1. English Macrostructure	-							
2. English NTW	.64*	-						
3. English NDW	.69*	.93*	-					
4. English MLUw	.75*	.66*	.71*	-				
5. Chinese Macrostructure	.48*	.34*	.31*	.40*	-			
6. Chinese NTW	.39*	.38*	.34*	.37*	.69*	-		
7. Chinese NDW	.36*	.33*	.32*	.32*	.70*	.95*	-	
8. Chinese MLUw	.48*	.38*	.36*	.52*	.73*	.72*	.74*	-

Note. Macrostructure = total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, *$p < .05$.

The relations among English and Spanish macrostructure and microstructure were also examined as shown in Table 6. Similar to the Chinese group, significant within-language relations were observed; however, cross-linguistic correlations were not found. Specifically, English NTW, NDW, and MLUw showed positive and significant association to English macrostructure respectively, $r(46) = .85$, $p < .05$, $r(46) = .87$, $p < .05$, and $r(46) = .72$, $p < .05$. As expected, English NTW and NDW, English NTW and MLUw, English NDW and MLUw showed significant and positive correlations respectively, $r(46) = .93$, $p < .05$, $r(46) = .70$, $p < .05$, and $r(46) = .73$, $p < .05$. Similar to the observation in the Chinese group, the correlations between English NTW and NDW were particularly strong as both measured lexical diversity.

Unexpectedly, Spanish NTW, NDW, and MLUw did not show a positive and significant association to Spanish macrostructure. As expected, Spanish NTW and NDW, Spanish NTW and

MLUw, and Spanish NDW and MLUw showed significant and positive correlations respectively $r(46) = .98$, $p < .05$, $r(46) = .78$, $p < .05$, and $r(46) = .76$, $p < .05$. The correlations between Spanish NTW and NDW were especially high, similar to their English results. Unlike cross-linguistic correlations of variables for the Chinese group, the Spanish group showed insignificant and some negative correlations across English and Spanish variables.

Table 6

Correlation of English and Spanish Macrostructure and Microstructure

Variable	1	2	3	4	5	6	7	8
1.English macrostructure	-							
2. English NTW	.85*	-						
3. English NDW	.87*	.93*	-					
4. English MLUw	.72*	.70*	.73*	-				
5. Spanish macrostructure	-.26	-.18	-.18	-.09	-			
6. Spanish NTW	-.15	-.09	-.15	-.14	.27	-		
7. Spanish NDW	-.18	-.14	.20	-.16	.26	.98*	-	
8. Spanish MLUw	.11	.10	.07	.12	.21	.78*	.76*	-

Note. Macrostructure = total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, *$p < .05$.

As shown in Table 7, all variables were within acceptable distance values for skewness and kurtosis (Kline, 2015). The results from the *t*-test on vocabulary skills showed that the Chinese girls had significantly higher raw English expressive vocabulary scores ($M = 15.15$, $SD = 4.70$) than that of the Chinese boys ($M = 12.56$, $SD = 5.75$). However, such a difference was nonexistent for the Spanish group. Hence, sex was included as a control variable in the following multiple linear regression models only for the Chinese group.

Table 7

Descriptive Statistics of Expressive Vocabulary Scores per Sex

	Chinese Boys ($N = 43$)				Chinese Girls ($N = 34$)				
Variable	*M (SD)*	Range	Skewness	Kurtosis	*M (SD)*	Range	Skewness	Kurtosis	*t*-test
Raw HL Vocab	11.58 (6.66)	1-23	.00	1.74	12.56 (6.27)	1-23	-.38	1.98	ns
Raw English Vocab	12.56 (5.75)	2-28	.25	2.92	15.15 (4.70)	6-23	-.03	2.31	2.17*
Stand English Vocab	80.79 (18.00)	40-127	.08	3.16	85.67 (16.40)	57-121	.24	2.56	ns
	Spanish Boys ($N = 18$)				Spanish Girls ($N = 30$)				
Variable	*M (SD)*	Range	Skewness	Kurtosis	*M (SD)*	Range	Skewness	Kurtosis	*t-test*
Raw HL Vocab	10.44 (7.16)	1-21	.12	1.68	9.1 (6.27)	0-22	.50	2.06	ns
Raw English Vocab	11.17 (4.58)	2-44	.44	2.83	12.07 (6.12)	3-22	-.18	1.57	ns
Stand English Vocab	74.5 (16.93)	40-101	-.42	2.44	76.37 (20.85)	40-118	-.08	2.06	ns

Note. HL = heritage language, Vocab = vocabulary, Stand = standard, ns = not significant, *$p < .05$.

Model 1 in Table 8 showed that Chinese macrostructure was a positive and significant predictor of English macrostructure ($\beta = .43$, $p < .01$). One unit change in Chinese macrostructure associated with a .43 increase in English macrostructure. Although age and sex were not the significant predictors of English macrostructure, 23% of the variance in English macrostructure was explained by these predictors together. The result that the HL macrostructure predicted English macrostructure was the same as the hypothesis and the results from the previous studies with Cantonese-English speaking children (Rezzonico et al., 2016).

Further, Model 2 in Table 8 showed that within-language microstructure, or English microstructure such as English NTW and MLUw were significant predictors of the English macrostructure ($\beta = .44$, $p < .05$, $\beta = .98$, $p < .05$). One unit change in English NTW associated with a .44 increase in English macrostructure, and one unit change in English MLWw associated with a .98 increase in English macrostructure. Though Chinese macrostructure, sex, and age were insignificant in this model, 53% of the variance in English macrostructure was explained by these predictors together. The result was different from the hypothesis that macrostructure is language interdependent for Chinese-English DLLs after controlling for English microstructure (Rezzonico et al., 2016).

Table 8

Multiple Linear Regression Models for the Chinese-English DLLs

	Model 1		Model 2	
Variable	*β*	*SE*	*β*	*SE*
Constant	-.10	.77	-1.81	.99
Chinese Macrostructure	.43	.13**	.11	.12
English NTW			.44	.18*
English MLUw			.98	.39*
Sex	-.19	.22	-.21	.21
Age	.02	.02	.01	.02
Adjusted R^2	.23		.53	
F	8.57***		10.71***	

df	76	76

Note. Macrostructure = total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, *$p < .05$, **$p < .01$., ***$p < .001$.

Different from the Chinese group which showed positive and significant relation between HL and English macrostructure, Model 3 in Table 9 showed that Spanish macrostructure negatively predicted English macrostructure. The results indicated that the Spanish macrostructure and age were significant predictors of English macrostructure ($\beta = -.28$, $p < .05$, $\beta = .07$, $p < .01$). One unit change in Spanish macrostructure associated with a .28 decrease in English macrostructure, and one unit change in age associated with a .07 increase in English macrostructure. The model showed that 20% of the variance in English macrostructure was explained by these predictors together. This result was not in line with the hypothesis and the results from the previous studies (Bohnacker, 2016; Kunnari et al., 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013) in that HL macrostructure was a negative predictor of English macrostructure.

Further, Model 4 in Table 9 showed that only within-language microstructure, or English NDW was a significant predictor of English macrostructure ($\beta = .84$, $p < .00$); however, Spanish macrostructure and age were insignificant in this model. Unlike the Chinese group, English MLUw was not a significant predictor of English macrostructure.

Table 9

Multiple Linear Regression Models for the Spanish-English DLLs

	Model 3		Model 4	
Variable	*β*	*SE*	*β*	*SE*

Constant	-.75	1.03	-1.66	.64**
Spanish Macrostructure	-.28	.12*	-.11	.06
Age	.07	.02**	.01	.01
English NDW			.84	.12***
English MLUw			.31	.25
Adjusted R^2	.20		.78	
F	6.76***		41.82***	
df	47		47	

Note. Macrostructure = total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word, *$p < .05$, **$p < .01$,***$p < .001$.

Conclusion of Results

To sum, the results from the descriptive statistics for the first research question identified non-normally distributed variables such as English macrostructure, all English microstructure (NTW, NDW, and MLUw), and Chinese NTW and NDW from the Chinese-English DLLs. The results also showed non-normally distributed variables such as English macrostructure, all English microstructure (NTW, NDW, and MLUw), and Spanish NTW and NDW from the Spanish-English DLLs. Overall, there were no statistically significant differences among the English and HL macrostructure and English microstructure for the two language groups. The two groups were significantly different in that the Spanish group used more temporality than the Chinese group did. However, they were not different in other categories such as animals, character labeling, direct or indirect quotes, and location words.

The results from the qualitative analysis showed advanced and less advanced characteristics of 12 Chinese-English DLLs and 17 Chinese-English DLLs as well as 13 Spanish-English DLLs and 13 Spanish-English DLLs respectively. The advanced and less advanced narratives were distinct in syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions for both language groups. While advanced narratives included complete sentences to describe events, less advanced narratives included single words such as listing merely animal characters or verbs, and they did not connect subjects and verbs to construct complete sentences. Though the majority of advanced narratives described character roles, it was not consistent for less advanced narratives. Advanced narratives included direct and indirect quotes, or character speech, but less advanced narratives had no quotes in English and children didn't speak as characters in the book. While advanced narratives explained characters' emotions such as love, happiness, and sadness in different scenes, such characteristics were unobserved in less advanced narratives. Finally, the majority of less advanced narratives included unintelligible utterances.

The results from the Pearson correlation exhibited significant within-language relations of macrostructure and microstructure in English for the Chinese and Spanish groups. While the Chinese group showed significant within-language relations of macrostructure and microstructure in Chinese, the same relations were unobserved for the Spanish group. Cross-linguistic correlations were observed only for the Chinese group. Further, multiple linear regression analysis showed that Chinese macrostructure was a significant predictor of English macrostructure, but age and sex were insignificant in the model without within-language microstructure, or Model 1. The result from the same model, Model 3 for the Spanish group, was different in that HL macrostructure was a significant but negative predictor of English

macrostructure, and age was also a significant predictor of English macrostructure. Finally, within-language microstructure (English NTW and MLUw for the Chinese group, and English NDW and MLUw for the Spanish group) predicted macrostructure, but HL macrostructure and age were not significant predictors of English macrostructure for both groups in Models 2 and 4. Although sex was included as a control variable for the Chinese group, it was not a significant predictor of English macrostructure.

Chapter V: Discussion, Implications, Limitations, and Conclusions

Introduction

This study provided a comprehensive understanding of narrative skills in two languages for Chinese-English and Spanish-English DLLs. As noted, early narrative skills are predictive of later literacy skills (Dickinson et al., 2003; Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018), and this study focused on young children between the ages of three and five to understand narrative skills at a young age. The findings from the mixed-method design contribute to the field of early bilingual studies by providing information that can be applied to classroom and home instruction to better support young children's narrative development. The comparison of the Chinese and Spanish groups also informs educators and parents about how to better assist DLLs from different linguistic and cultural backgrounds. Finally, the study analyzed the narratives of the two largest DLL populations to examine language interdependence (Cummins, 1981) of narrative macrostructure between English and HL.

This section summarizes the results of the three research questions. First, the results from the descriptive statistics of macrostructure and microstructure for both English and HL data for the Chinese and Spanish groups will be discussed. In addition to macrostructure and microstructure, this section discusses the similarities and differences among the English

narratives of the Chinese and Spanish groups in additional categories (animals, character labeling, temporality, direct or indirect quotes, and location words) that also relate to overall narrative skills. Second, characteristics of advanced and less advanced narrative skills will be discussed in relation to the results from previous studies. Third, the results from the multiple linear regression analysis of macrostructure's language interdependence will be discussed. This section also presents implications and recommendations to educators and parents of young Chinese-English and Spanish-English DLLs to better support their bilingual narrative development. Some limitations and suggestions for future studies will be presented. Finally, the section concludes by summarizing key findings of the study.

Summary of Findings

The results from the demographic information for both language groups showed that DLLs had more HL input and output than English input and output at home. The Chinese group exhibited higher expressive vocabulary skills in both English and HL than the Spanish group. Although the Chinese parents had significantly longer years of education, the two groups shared similar parental age and similar low socioeconomic status. It is possible that differences in parental years of education may have influenced the DLLs' expressive vocabulary skills as parental education levels may influence home literacy practices which may further affect children' language outcomes (Chen & Ren, 2019).

Overall Narrative Skills of the Chinese and Spanish Groups

Overall, the data suggested that there were no statistically significant differences between the Chinese and Spanish groups in English macrostructure, HL macrostructure, and English microstructure. Previous studies suggested that there exist unique literacy habits based

on the communities children live in, and that the history of the community may influence their literacy habits (e.g., Heath, 1982). Research has also underscored children's various storytelling styles per cultural and language group because children and parents from different cultures interact uniquely in activities such as book-sharing (Luo et al., 2014) based on different values. However, the results from the descriptive statistics indicated that the narratives were more similar than different in this sample of Chinese-English and Spanish-English DLLs.

The descriptive statistics from the Chinese group showed that the majority of their English and Chinese macrostructure and microstructure appeared on the lower end of the distributions and only MLUw was normally distributed. Similarly, the descriptive statistics from the Spanish group showed that the majority of their English and Spanish macrostructure and microstructure appeared on the lower end of the distributions and only MLUw was normally distributed. These results indicate that young DLLs' narrative skills measured in microstructure and macrostructure largely varied as can be seen in high standard deviation values, and the majority of the DLLs' narrative skills except MLUw showed abnormal distributions. It is also important to note that the macrostructure coding scheme was meant to measure how much event component the children mentioned, and microstructure measures were meant to capture lexical and grammatical diversity within narratives that are different from standardized measures. Hence, abnormal distributions of the data were expected as opposed to the observations using standardized or normed tests. The results from the first research question showed that for both the Chinese and Spanish groups, their differences between English and HL mean microstructure were insignificant. Similarly, their differences between the English and HL expressive vocabulary were insignificant for both Chinese and Spanish groups. These results indicate that

both groups of DLLs were developing microstructure and vocabulary skills in English and HL at similar levels.

In the study by Luo et al. (2014) which investigated narratives of ethnically diverse children age five, the overall mean regardless of sex was 4.75 points for Chinese-speaking children and 4.45 points for Spanish-speaking children. The participants from the current study showed the mean English event component for the Chinese-English DLLs as 5.25 points ranged between 0 and 21 points and that of Spanish-English DLLs as 5.86 points ranged between 0 and 21 points. Hence, the scores in the English event component from the current participants were slightly higher than those of the participants in Luo et al. (2014). However, the scores of their HL event component were slightly lower than those of the participants Luo et al. (2014) in that the mean for the Chinese-English DLLs was 3.52 points ranging between 0 and 17 points and similar for the Spanish-English DLLs whose mean HL event component was 4.69 points ranging between 0 and 16. The score of the current participants' HL was lower possibly because the data collection of Luo et al. (2014) allowed children to switch languages freely, so they could answer in any language, while the current study did not credit utterances in other languages.

The analysis of additional categories indicated that the Spanish-English DLLs included more temporality than the Chinese-English DLLs did. There were no statistically significant differences in other categories such as animals, character labeling, direct and indirect quotes, location words, and the total score of these five categories. These results did not fully agree with the previous studies that highlight the existence of unique narrative characteristics of children from different cultures (Heath, 1982; Luo et al., 2014). It is possible that unique characteristics were not found since the additional categories were analyzed only in English. Because both

groups used more HL than English at home, DLLs may have more opportunities to present their unique narrative telling styles in their HL.

As discussed in the literature review of this study, Silva and McCabe (1996) in their description of Latino storytelling styles, noted that Mexican children's narratives center on personal or family topics and describe the appearance of objects, while they do not emphasize event sequencing. However, the Spanish-English DLLs in the current study showed the use of temporality, or event sequencing. Importantly, they used significantly more temporality than the Chinese-English DLLs did although the scoring was based on whether or not they noted temporality at least once in their entire narratives. Though the description of appearances was not directly coded, character labeling in which children distinguish different characters was coded. The results showed that there were no group differences between the Chinese and Spanish groups in this category.

To sum, the results from the current study were partially in line with the previous studies (Heath, 1982; Luo et al., 2013, 2014; Silva & McCabe, 1996; Smith & Johnson, 2019) in that the Spanish group used more temporality than the Chinese group. There were no differences in animals, character labeling, direct and indirect quotes, and location words. Different characteristics such as describing the appearance of objects and no use of event sequencing by the Spanish group (Silva & McCabe, 1996) were not found.

Qualitative Characteristics of Advanced and Less Advanced Narratives

The analysis of advanced and less advanced English narratives revealed that the two groups were different in four characteristics such as syntactic complexity, character delineation,

direct and indirect quotes, and character emotions and intentions. The children in the advanced groups were significantly older than the children in less advanced groups.

First, children in advanced groups made complete sentences with clear subjects and verbs; however, children in less advanced groups did not include complete sentences which clearly connect subjects and verbs to describe character actions and the basic event components. Thus, one-word utterances did not explain the story and resulted in no scores in macrostructure. As previously mentioned, there was a significant difference in the microstructure measures such as English NTW and NDW between the advanced and less advanced groups. In addition, the less advanced group did not have sufficient vocabulary skills to describe important events to complete the story. One-word or two-word utterances require gradually complex grammatical structures (Tomasello & Slobin, 2004). Since lexical skills are typically acquired prior to grammar skills, the lack of vocabulary skills presumably led to disconnected subjects and verbs or their use of a few words.

The lack of grammatical skills were also observed in the significant differences in MLUw between the advanced and less advanced groups for the two language groups, showing that the mean length of utterances from the less advanced groups was significantly shorter than that of the advanced groups. In the longitudinal study of Witkowska et al. (2022), bilingual children between the ages of five to six and seven to eight in the United Kingdom presented syntactically complex English narratives equivalent to their monolingual English-speaking peers matched by sex, age, and teacher-reported language proficiency. The growth rate of their English syntactic complexity in narratives was associated with their English vocabulary in early years. Although some DLLs in the current study produced narratives with less syntactic complexity, their lack of

vocabulary may have been related to their less complex grammar. Thus, strengthening vocabulary skills may play an important role in their grammar skills in later years.

Second, the advanced narratives included character delineation which highlights different characters such as brother, sister, or friend in the story (Heilman et al., 2010; Uchikoshi, 2005). In contrast, from the less advanced groups, 47% of the Chinese and 23% of the Spanish groups used character delineation. The results indicated that the children in less advanced groups did not touch on different character roles such as main and supporting characters (Heilman et al., 2010; Uchikoshi, 2005). As measured in the narrative scoring scheme (NSS) (Heilman et al., 2010), distinguishing main and supporting characters and emphasizing the main character are significant aspects in character delineation which contribute to narrative macrostructure. Although the different sizes of animals in the picture book showed character roles such as parents and children, the DLLs in less advanced groups may not have paid attention to the relationship among animals depicted by the sizes. It is also possible that they recognized different character sizes and roles, but did not have the vocabulary to describe the character relations. Hence, in order to improve narrative quality, it is important to teach young DLLs to pay attention to different characters and introduce main and supporting characters when they appear in the story.

Third, children in advanced groups used direct and indirect quotes that separated themselves from a story character to describe events (Bamberg & Damrad-Frye, 1991) and conversations among characters also explained the story components. In contract, children in less advanced groups for both languages did not use direct or indirect quotes to separate themselves from the characters (Bamberg & Damrad-Frye, 1991). Heilman et al. (2010) also noted that the use of first-person voice as in “The monkey said ‘I need your help to look for my mom’” is a

significant skill in child narratives. As seen in the example of a child from the less advanced Spanish group, one child pretended to be crying, but he did not describe the monkey as a character who was crying. Similar to the Spanish-English speaking kindergartners in Uchikoshi (2005), use of quotes to paint a more vivid verbal picture of narratives seemed to be an advanced tool for some children in less advanced groups.

Fourth, the advanced narratives described character emotions (e.g., "happy" or "sad") and intentions (e.g., "they wanted to go home (be)cause they were tired.") that moved the plots forward (Bamberg & Damrad-Frye, 1991; Chang, 2004; Uchikoshi, 2005). However, less advanced groups for both languages did not mention the emotions. Although one Spanish-English DLL mentioned adjectives (e.g., "happy", or "sad"), these adjectives were not connected to the character. As Luo et al. (2014) highlighted, narrative skills predict later academic success, school readiness, and cognitive and socio-emotional development, the mention of character emotion is a significant part of narrative skills. The results of the current study agrees with Luo et al. (2014) in that the information available in the picture was easier to express and making inferences to the information not presented in the picture required more cognitive demands. The children in less advanced groups did not have skills to discuss emotions or note the information beyond the pictures. On the contrary, the children in advanced groups provided reasons for actions and emotion as in "they hug (be)cause he loves his mom.".

In addition, 76% of the children in the Chinese and 100% of the children in the Spanish less advanced groups spoke unintelligible utterances. In order to accurately process the data, both audio and video recordings were transcribed and reviewed by research assistants with high fluency; however, some children's articulation was not clear enough to be understood. It is possible that young children were being shy because they had to speak to a research assistant that

they had just met. Because the children in less advanced groups were significantly younger than the ones in the advanced groups, the older children showed less or no unintelligible utterances. Hence, it is important to note that age may also contribute to their narrative advancement not only in intelligible utterances but also other areas.

Finally, when they were asked to speak in English, two children from the less advanced Spanish group explained the story component correctly in Spanish. One child from the less advanced Chinese group also said, "monkey 爸爸" to describe the monkey dad. Similarly, one child from the less advanced Spanish group said "esto es del bebé" to describe the baby. However, since children were asked to speak in only one language, the utterance in another language was not counted as their English score in this study. It is important to note that DLLs may know how to describe events and characters in one language, but not in another language.

Cross-linguistic Relation of Macrostructure

The results from the regression analysis did not support Cummins's interdependence hypothesis (Cummins, 1981) in that HL macrostructure did not predict English macrostructure after controlling for English microstructure for both Chinese and Spanish groups. As hypothesized, within-language correlations of macrostructure and microstructure were observed in English and HL for the Chinese and only in English for the Spanish group (Heilmann et al., 2010; Méndez et al., 2018). The results agree with the findings from Rodina (2017) that showed significant correlations between macrostructure and MLU in Russian, but not in Norwegian suggesting that within-language relations could change depending on the typological distance between the two languages. The Chinese group showed significant cross-linguistic correlations of macrostructure and microstructure although they were smaller than within-language

correlations. However, the Spanish group's NTW, NDW, and MLUw did not show a positive and significant association to Spanish macrostructure. As shown in the data analysis, a higher percentage of code-switching for the Spanish group (14% of the Chinese group and 25% of the Spanish group showed code-switching) was observed possibly because both Spanish and English use an alphabetic system and the two languages are more similar than Chinese and English. Spanish and English also have cognates which have similar sounds and spellings (Bravo et al., 2007). It is possible that the utterances with code-switching that were excluded from the analysis may have influenced the insignificant positive correlation between Spanish NTW, NDW, and MLUw and Spanish macrostructure.

Looking at the regression models without English microstructure, the results from the Chinese group were in line with the previous studies that showed cross-linguistic association of macrostructure for young bilingual children (Bohnacker, 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013). However, once within-language microstructure was added in the modes, HL macrostructure lost its predictive power for both language groups. While both English NTW and MLUw were significant predictors of English macrostructure for the Chinese group, NDW was not a significant predictor of English macrostructure for the Spanish group.

These differences between the Chinese and Spanish groups in (observation of within-language correlations in HL only for the Chinese group, negative association between Spanish and English macrostructure for the Spanish group, and differences in significant predictors of English macrostructure: NTW and MLUw for the Chinese and NDW for the Spanish group) may indicate that the group's skills were different. While there were no statistically significant differences between the two groups in their English macrostructure, HL macrostructure, and

English microstructure, significant differences were found in their HL and English expressive vocabulary scores. The scores of expressive vocabulary showed that the Chinese group's vocabulary skills were significantly higher than these of the Spanish group. Hence, the advancement in vocabulary may have affected the cross-linguistic relations of variables.

The results from the final regression models indicate that children with higher English lexical skills such as larger number of total words (NTW), number of different words (NDW), or longer mean length of utterances in word (MLUw) produced higher quality narratives in the same language (Bitetti et al., 2020). As Cummins (1981) noted, language transfer is observed when a learner's L1 cognitive or academic language proficiency (CALP) is well developed and older learners' L1 is more developed. Since children's L1 skills need to be adequately strong and well-established for cross-linguistic transfer to occur, it is possible that the narrative skills of these young DLLs were underdeveloped and that the transfer was unobserved. Analysis of the data from the same children a year or two years later may change the results, since they may have stronger HL.

Effects of Age and Sex

When including age in the regression models, the effect was not found in both regression models for the Chinese group. However, the effect was found in the simple regression model where HL macrostructure and age predicted English macrostructure for the Spanish group, or Model 3. The past studies have emphasized the significant effects of age on English macrostructure as well as microstructure for young bilingual children (e.g., Rezzonico et al., 2016). In addition, the participants in the study had a wide age range (Chinese-English DLLs: 36-61 months, Spanish: 36-63 months); however, the results from the two regression models for the Chinese group and one regression model for the Spanish group did not show the significance

in age differences like other studies did (e.g., Bitetti et al., 2020; Kang, 2012, Lucero, 2018). It is possible that these DLLs had various bilingual exposure and that the age was not a significant predictor in regression models.

Similarly, previous studies noted sex difference is relevant to narrative skills (Luo et al., 2014). Regarding macrostructure in her study, the mean of event component out of 33 points for the Chinese boys was 3.12 points ranged between 0 and 11 points and that of the Mexican boys was 3.59 points ranged between 0 and 15 points. The same score for the Chinese girls was 6.38 points ranged between 0 and 16 points and that of the Mexican girls was 5.30 points ranged between 0 and 14 points. Hence, the current study first determined whether to include sex differences in the regression models by comparing the raw and standard English expressive vocabulary scores of boys and girls per language group. The result showed that the Chinese girls had significantly higher raw English expressive vocabulary than the Chinese boys. Thus, sex was added only in the Chinese group's regression model, or Model 2. However, the sex difference was not significant in predicting the Chinese group's English macrostructure like other studies (Kang, 2012, Lucero, 2018; Uchikoshi, 2005).

Implications

The study demonstrated that the Chinese and Spanish groups were more similar than different in their overall narrative skills (macrostructure) and detailed narrative skills (microstructure). Since they lived in the same geographical areas in Northern California, is it possible that the two groups received similar instruction following similar curricula, and that they were more similar in their narrative characteristics. It is also possible that the way that the wordless picture book was constructed did not provide opportunities to present unique ways in telling stories.

Since the narratives from the two DLL groups were similar, teachers may follow similar curriculum and strategies. Namely, in order to improve macrostructure, teachers may guide young DLLs to highlight each event component that appear in symbolic children's storybooks: opening or introduction, setting orientation, character delineation, problems, resolutions, and a conclusion (Bamberg & Damrad-Frye, 1991; Heilmann et al., 2010; Labov and Waletzky, 1967; Peterson & McCabe, 1983; Uchikoshi, 2005). Young children may be asked questions that refer to each of these components, such as "How does the story start?", "Where are the characters?", "What time of the day is it?", "Who are the main characters?", "What's the problem here?", "How are they solving the problem?", and "How does this story end?". Young DLLs may also be taught that these small event components make up a complete story, and that these components help their listeners understand the stories. In addition, teachers may teach children how to connect these event components and sequence using temporality.

As seen in the results that the Spanish group used more temporality than the Chinese group, tailored training per group may also support DLLs from different language groups. For example, the Chinese group may need more support in describing temporal relationships in narrative storylines compared to the Spanish group. Parents and educators of Chinese-English DLLs may highlight the connection of event components, when each event occurs in books, and how to use connectives such as "and then", "before", and "after".

In order to support children with less advanced narrative skills, the results imply that they need to be supported in multiple areas such as syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions. Specifically, they need support in making complete sentences that connect a subject and a verb to describe a simple event. For

example, if children say a verb like “crying”, or an adjective like “sad”, teachers may ask “Who is crying?” or “Who is sad?”. Educators and parents may also highlight different characters in the story. Take the examples from *Hug* (Alborough, 2002): going over pictures and emphasizing character sizes or different types of animals may help children understand different character roles. Since the main characters appear more frequently in this book, repetition of characters with different actions may help children understand the role of the main character as it is one aspect of character labeling (Heilman et al., 2010; Uchikoshi, 2005). Teaching these characters’ conversations and the difference between the characters and narrators may help young DLLs understand the importance of quotes to construct better quality narratives (Bamberg & Damrad-Frye, 1991).

It is also crucial to teach that the characters have different feelings and emotions in various scenes. Because some emotions are obvious from pictures and mention of them requires less cognitive demand (Luo et al., 2014), looking at characters’ body language and facial expressions and talking about them may also help children recognize various emotions. After they are able to notice and discuss overt emotions, they can be supported with inferential information not clearly depicted in the pictures. For instance, discussion of reasons for actions and feelings may help children make inferences that allow them to construct more in-depth narratives. Since many children from the less advanced groups showed unintelligible utterances, educators and parents of young DLLs may encourage children to speak louder and more clearly so that their listeners understand what they are saying. These skills are crucial in later schooling since they are required to present what they have learned explicitly (Peterson & McCabe, 1994) and to retell, summarize, and paraphrase in classrooms (Kao, 2014).

The significant relation between microstructure and overall narrative skills suggests that DLLs need strong vocabulary and grammar to build better quality narratives. The results also suggest that educators and parents of DLLs need to support their early vocabulary first and grammar in each language second to improve their bilingual narrative abilities in the same language. As Hsin et al. (2022a) reported, 81% of the families who raise DLLs have received English learning materials such as conversation starters and games, but 51% of them received these materials in HL such as Cantonese, Mandarin, and Spanish. Hence, sufficient home language resources including materials in HL should be provided for families who raise young DLLs to support HL development. Meanwhile, educators should recognize the importance of narrative skills in HL to fully support young DLLs' language skills.

To sum, this study suggests that educators and parents of young DLLs may focus on developing overall narrative skills such as describing small story components, and connecting them chronologically especially in their HL as language transfer is observed when a learner's L1 CALP is well developed (Cummins, 1981). Children with less advanced narrative skills may require assistance in areas like syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions. Establishing strong vocabulary and grammar skills may build a robust foundation for better quality narratives.

Limitations and Future Research

The generalizability of this study is limited in that the current study investigated 77 Chinese-English and 48 Spanish-English DLLs from low-income families in Northern California, and more studies with DLLs from geographically and linguistically diverse backgrounds are needed to understand the heterogeneity of DLL populations (López & Foster,

2021). When HL macrostructure and age predicted English macrostructure, HL macrostructure was a significant predictor of English macrostructure for both groups (Bohnacker, 2016; Méndez et al., 2018; Rezzonico et al., 2016; Rodina, 2017; Schwartz & Shaul, 2013) although the association was negative for the Spanish group. After controlling for the within-language microstructure for both the Chinese and Spanish groups, the study did not align with the previous studies that supported the interdependence hypothesis (Cummins, 1981), possibly due to underdeveloped narrative skills in their HL. Future studies may include the longitudinal narrative data to see the changes in relationships between English and HL macrostructure over time. Such analysis will also reveal how young DLLs' bilingual narratives develop and whether the interdependence of language skills changes over time. Analysis of narratives from older DLLs may also allow investigation of language interdependence with participants with stronger language skills, which may lead to transfer of skills (Cummins, 1981).

In addition, the study observed similarities of the Chinese and Spanish groups in the qualitative analysis of advanced and less advanced groups only in English. Future study may look at both English and HL to investigate their narrative quality since children may have more opportunities to use their unique language skills in their home language, or HL. It is also possible that children have more culture-specific language usage and presentation of narratives in their HL.

Further, this study did not include other types of data about home resource availability such as numbers of books in English and HL at home. Although the study included how much English and HL they spoke as input and output, it did not have detailed information on language practices or family language ideologies (Curdt-Christiansen, 2009) which may also influence

young DLLs' narrative development. Therefore, future research could include a more comprehensive data set of home language environments and family language education policy. Similarly, the same picture book was used to obtain narratives in both English and HL, and some children may have remembered the content, or they were more reluctant to complete the task the second time. Future studies may employ different picture books for each language to reduce memory effects and to maintain young children's focus.

Finally, among less advanced groups, 29% of the children in the Chinese and 100% of the children in the Spanish groups included irrelevant topics or did not understand the storyline. It is possible that young DLLs were unwilling to tell the story because they experienced a long day of data collection. Therefore, future studies may improve data collection procedures such as testing fewer skills in one day to maintain children's concentration and participation in the narrative activity.

Conclusions

The results from this study presented Chinese-English and Spanish-English DLLs' overall narratives skills and showed no significant differences in their English macrostructure, HL macrostructure, and English microstructure. The Chinese-English and Spanish-English DLLs were different only in one category such that the Spanish group used more temporality than did their Chinese peers. The qualitative analysis identified advanced and less advanced narratives, and revealed that advanced groups showed more skills in four different categories such as syntactic complexity, character delineation, direct and indirect quotes, and character emotions and intentions. The qualitative results also provided suggestions on how to improve less advanced narratives such as teaching children to make complete sentences and to mention

different characters with various roles. The data also suggest teaching children character conversations to move the story forward and that characters are separate from the narrator themselves. Finally, the data suggest that children should be supported in observing overt character emotions from pictures and discussing feelings first, and then in talking about characters' intentions or information that can not be directly observed in pictures.

The key findings showed no association between English and HL macrostructure, and significant within-language correlations of macrostructure and microstructure were observed for both the Chinese and Spanish groups. Research on narratives is significant because children are required to utilize narrative skills, or ability to present stories unshared with the listener, as they advance in American educational contexts (Peterson & McCabe, 1994) and children who produce advanced narratives have an easier transition to literacy activities (e.g., Heath, 1982; Peterson & McCabe, 1994). Examination of early narrative skills before they enter elementary school may assist DLLs' later academic success with reading (Miller et al., 2006, Reese et al., 2010; Uchikoshi et al., 2018) and cognitive skills like socio-emotional development (Luo et al., 2014). Because DLLs may develop two languages in unique ways, the current study contributes to the comprehensive understanding of their language development in bilingual narratives. Finally, because Chinese-English and Spanish-English DLLs are the two largest DLL populations within American educational contexts, the examination of DLLs' heterogeneity provided useful information for their parents and educators to better support young DLLs in their narrative advancement and future academic success.

References

Alborough, J. (2002). Hug. Cambridge, Mass.: Candlewick Press.

Bamberg, M., & Damrad-Frye, R. (1991). On the ability to provide evaluative comments: Further explorations of children's narrative competencies. *Journal of Child Language*, *18*(3), 689-710.

Bedore, L. M., Pena, E. D., Gillam, R. B., & Ho, T. H. (2010). Language sample measures and language ability in Spanish-English bilingual kindergarteners. *Journal of communication disorders*, *43*(6), 498-510.

Berman, R. A. (1988). On the ability to relate events in narrative. *Discourse Processes*, *11*(4), 469-497.

Bitetti, D., & Hammer, C. S. (2016). The home literacy environment and the English narrative development of Spanish–English bilingual children. *Journal of Speech, Language, and Hearing Research*, *59*(5), 1159-1171.

Bitetti, D., Hammer, C. S., & López, L. M. (2020). The narrative macrostructure production of Spanish–English bilingual preschoolers: Within-and cross-language relations. *Applied Psycholinguistics*, *41*(1), 79-106.

Bliss, L. S., McCabe, A., & Miranda, A. E. (1998). Narrative assessment profile: Discourse analysis for school-age children. *Journal of communication disorders*, *31*(4), 347-363.

Bohnacker, U. T. E. (2016). Tell me a story in English or Swedish: Narrative production and comprehension in bilingual preschoolers and first graders. *Applied Psycholinguistics*, *37*(1), 19-48.

Bonifacci, P., Barbieri, M., Tomassini, M., & Roch, M. (2018). In few words: linguistic gap but adequate narrative structure in preschool bilingual children. *Journal of Child Language*, *45*(1), 120-147.

Bravo, M. A., Hiebert, E. H., & Pearson, P. D. (2007). Tapping the linguistic resources of Spanish/English bilinguals: The role of cognates in science. *Vocabulary acquisition: Implications for reading comprehension*, 140-156.

Brown, R. (1973). Development of the first language in the human species. *American Psychologist*, *28*(2), 97.

Chang, C. J. (2004). Telling stories of experiences: Narrative development of young Chinese children. *Applied Psycholinguistics*, *25*(1), 83-104.

Chen, J. J., & Ren, Y. (2019). Relationships between home-related factors and bilingual abilities: A study of Chinese–English dual language learners from immigrant, low-income backgrounds. *Early Childhood Education Journal*, *47*(4), 381-393.

Chernoff, J. J., Keuter, S., Uchikoshi, Y., Quick, H., & Manship, K. (2021). Challenges in assessing California's diverse dual language learners.

Chung, S., Zhou, Q., Anicama, C., Rivera, C., & Uchikoshi, Y. (2019). Language proficiency, parenting styles, and socioemotional adjustment of young dual language learners. *Journal of cross-cultural psychology*, *50*(7), 896-914.

Cummins, J. (1981). Empirical and theoretical underpinnings of bilingual education. *Journal of education*, *163*(1), 16-29.

Curdt-Christiansen, X. L. (2009). Invisible and visible language planning: Ideological factors in the family language policy of Chinese immigrant families in Quebec. *Language policy*, *8*(4), 351-375.

Curenton, S. M. (2011). Understanding the landscapes of stories: The association between preschoolers' narrative comprehension and production skills and cognitive abilities. *Early Child Development and Care*, *181*(6), 791-808.

Curran-Everett, D. (2018). Explorations in statistics: the log transformation. *Advances in physiology education*, *42*(2), 343-347.

Dickinson, D. K., McCabe, A., Anastasopoulos, L., Peisner-Feinberg, E. S., & Poe, M. D. (2003). The comprehensive language approach to early literacy: The interrelationships among vocabulary, phonological sensitivity, and print knowledge among preschool-aged children. *Journal of Educational psychology*, *95*(3), 465.

Eaton, J. H., Collis, G. M., & Lewis, V. A. (1999). Evaluative explanations in children's narratives of a video sequence without dialogue. *Journal of Child Language, 26*(3), 699-720.

Fiestas, C. E., & Peña, E. D. (2004). Narrative discourse in bilingual children. *Language, Speech, and Hearing Services in Schools*.

Geva, E. (2006). Second-language oral proficiency and second-language literacy. *Developing literacy in second-language learners: Report of the National Literacy Panel on Language-Minority Children and Youth*, 123-139.

Glen, S., (2015, September 22). Multicollinearity: Definition, Causes, Examples. *Statistics How To.* https://www.statisticshowto.com/multicollinearity/

Gottardo, A., & Mueller, J. (2009). Are first-and second-language factors related in predicting second-language reading comprehension? A study of Spanish-speaking children acquiring English as a second language from first to second grade. *Journal of Educational Psychology*, *101*(2), 330.

Griffin, T. M., Hemphill, L., Camp, L., & Wolf, D. P. (2004). Oral discourse in the preschool years and later literacy skills. *First language*, *24*(2), 123-147.

Gutiérrez-Clellen, V. F. (2002). Narratives in two languages: Assessing performance of bilingual children. *Linguistics and Education, 13*(2), 175-197.

Gutiérrez-Clellen, V.F., & Kreiter, J. (2003). Understanding child bilingual acquisition using parent and teacher reports. *Applied Psycholinguistics, 24*, 267-288.

Hammer, C. S., Hoff, E., Uchikoshi, Y., Gillanders, C., Castro, D. C., & Sandilos, L. E. (2014). The language and literacy development of young dual language learners: A critical review. *Early childhood research quarterly*, *29*(4), 715-733.

Hao, Y., Bedore, L. M., Sheng, L., & Peña, E. D. (2019). Narrative skills in two languages of Mandarin–English bilingual children. *International Journal of Speech-Language Pathology, 21*(4), 325-335.

Heath, S. B. (1982). What no bedtime story means: Narrative skills at home and school. *Language in society*, *11*(1), 49-76.

Heilmann, J., Miller, J. F., Nockerts, A., & Dunaway, C. (2010). Properties of the narrative scoring scheme using narrative retells in young school-age children. *American Journal of Speech-Language Pathology*.

Hipfner-Boucher, K., Milburn, T., Weitzman, E., Greenberg, J., Pelletier, J., & Girolametto, L. (2015). Narrative abilities in subgroups of English language learners and monolingual peers. *International Journal of Bilingualism*, *19*(6), 677-692.

Holtby, S., Lordi, N., Park, R., & Ponce, N. A. (2017). Families with Young Children in California: Findings from the California Health Interview Survey, 2011–2014. *American Journal of Medical Research*, *4*(2), 168-178.

Hsin, L., White, L., Manship, K., Quick, H., & American Institutes for Research (2022a). Quick Facts: Engaging Dual Language Learner Families in Their Children's Early Education.

Hsin, L., White, L., Anthony, J., de los Reyes, I. B., Holtzman, D., Martin, A., Manship, K., & Quick, H. (2022b). Research Brief: Engaging Dual Language Learner Families in Their Children's Early Education.

Jacobson, P. F., & Walden, P. R. (2013). Lexical diversity and omission errors as predictors of language ability in the narratives of sequential Spanish–English bilinguals: A cross-language comparison. *American Journal of Speech-Language Pathology*.

Kang, J. Y. (2012). How do narrative and language skills relate to each other?: Investigation of young Korean EFL learners' oral narratives. *Narrative Inquiry*, *22*(2), 307-331.

Kao, S. M. (2014). *Narrative development of school children: Studies from multilingual families in Taiwan*. Springer.

Kapalková, S., Polisenska, K., Marková, L., & Fenton, J. (2016). Narrative abilities in early successive bilingual Slovak-English children: A cross-language comparison. *Applied Psycholinguistics, 37*(1), 145.

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford publications.

Kunnari, S., Välimaa, T., & Laukkanen-Nevala, P. (2016). Macrostructure in the narratives of monolingual Finnish and bilingual Finnish-Swedish children. *Applied Psycholinguistics, 37*(1), 123.

Labov, W. (1972). *Language in the inner city: Studies in the Black English vernacular* (No. 3). University of Pennsylvania Press.

Labov, W. (2010). Oral narratives of personal experience. *Cambridge encyclopedia of the language sciences*, 546-548.

Labov, W., & Waletzky, J. (1967). Narrative analysis: Oral versions of personal experience. In J. Helm (Ed.), Essays on the verbal and visual arts (pp. 12–44). Seattle: University of Washington Press.

López, L. M., & Foster, M. E. (2021). Examining heterogeneity among Latino dual language learners' school readiness profiles of English and Spanish at the end of Head Start. *Journal of Applied Developmental Psychology*, *73*, 101239.

Lucero, A. (2015). Cross-linguistic lexical, grammatical, and discourse performance on oral narrative retells among young Spanish speakers. *Child Development*, *86*(5), 1419-1433.

Lucero, A. (2018). Oral narrative retelling among emergent bilinguals in a dual language immersion program. *International Journal of Bilingual Education and Bilingualism*, *21*(2), 248-264.

Lucero, A., & Uchikoshi, Y. (2019). Narrative assessments with first grade Spanish-English emergent bilinguals: Spontaneous versus retell conditions. *Narrative Inquiry, 29*(1), 137-156.

Luo, R., & Tamis-LeMonda, C. S. (2019). Preschool book-sharing and oral storytelling experiences in ethnically diverse, low-income families. *Early Child Development and Care*.

Luo, R., Tamis-LeMonda, C. S., & Song, L. (2013). Chinese parents' goals and practices in early childhood. *Early Childhood Research Quarterly, 28*(4), 843-857.

Luo, R., Tamis-LeMonda, C. S., Kuchirko, Y., F. Ng, F., & Liang, E. (2014). Mother–child book-sharing and children's storytelling skills in ethnically diverse, low-income families. *Infant and Child Development*, *23*(4), 402-425.

Luo, S. H., & Wiseman, R. L. (2000). Ethnic language maintenance among Chinese immigrant children in the United States. *International Journal of Intercultural Relations*, *24*(3), 307-324.

MacWhinney, B. (2000). The CHILDES Project: Tools for Analyzing Talk. 3rd Edition. Mahwah, NJ: Lawrence Erlbaum Associates.

Mancilla-Martinez, J., & Lesaux, N. K. (2010). Predictors of reading comprehension for struggling readers: The case of Spanish-speaking language minority learners. *Journal of educational psychology*, *102*(3), 701.

Martinez-Adrian, M., & Gallardo-Del-Puerto, F. (2017). The effects of language typology on L2 lexical availability and spelling accuracy. *International Journal of English Studies*, *17*(2), 63-79.

Melzi, G., & Caspe, M. (2005). Variations in maternal narrative styles during book reading interactions. *Narrative inquiry*, *15*(1), 101-125.

Méndez, L. I., Perry, J., Holt, Y., Bian, H., & Fafulas, S. (2018). Same or different: Narrative retells in bilingual Latino kindergarten children. *Bilingual Research Journal*, *41*(2), 150-166.

Migration Policy Institute, National Center on Immigrant Integration Policy, "U.S. Young Children (ages 0 to 8) by Dual Language Learner Status: National and State Sociodemographic and Family Profiles" (data tables, MPI, Washington, DC, 2021).

Miller, R. D., Correa, V. I., & Katsiyannis, A. (2018). Effects of a Story Grammar intervention with repeated retells for English learners with language impairments. *Communication Disorders Quarterly*, *40*(1), 15-27.

Miller, J. F., Andriacchi, K., & Nockerts, A. (2019). *Assessing Language Production Using SALT Software: A clinician's guide to language sample analysis (3rd Edition)*. Madison, WI: SALT Software, LLC.

Miller, J. F., Heilmann, J., Nockerts, A., Iglesias, A., Fabiano, L., & Francis, D. J. (2006). Oral language and reading in bilingual children. *Learning Disabilities Research & Practice*, *21*(1), 30-43.

Minami, M., & McCabe, A. (1991). Haiku as a discourse regulation device: A stanza analysis of Japanese children's personal narratives. *Language in society*, *20*(4), 577-599.

Paradis, J., Genesee, F., & Crago, M. B. (2011). *Dual language development and disorders : a handbook on bilingualism and second language learning* (2nd ed., Ser. Communication and language intervention series). Paul H. Brookes Pub.

Paris, A. H., & Paris, S. G. (2003). Assessing narrative comprehension in young children. *Reading Research Quarterly*, *38*(1), 36-76.

Park, M., O'Toole, A., & Katsiaficas, C. (2017). Dual Language Learners: A Demographic and Policy Profile for Georgia. Fact Sheet. *Migration Policy Institute*.

Park, M., Zong, J., & Batalova, J. (2018). *Growing superdiversity among young US dual language learners and its implications*. Washington, DC: Migration Policy Institute.

Peterson, C., & McCabe, A. (1983). Developmental psycholinguistics: Three ways of looking at a child's narrative. New York: Plenum Press.

Peterson, C., & McCabe, A. (1994). A social interactionist account of developing decontextualized narrative skill. *Developmental Psychology*, *30*(6), 937.

Peterson, C., Jesso, B., & McCabe, A. (1999). Encouraging narratives in preschoolers: An intervention study. *Journal of child language*, *26*(1), 49-67.

Pinto, G., Tarchi, C., & Bigozzi, L. (2015). The relationship between oral and written narratives: A three-year longitudinal study of narrative cohesion, coherence, and structure. *British Journal of Educational Psychology*, *85*(4), 551-569.

Pinto, G., Tarchi, C., & Bigozzi, L. (2019). The impact of children's lexical and morphosyntactic knowledge on narrative competence development: A prospective cohort study. *The Journal of genetic psychology*, *180*(2-3), 114-129.

Purcell-Gates, V. (1988). Lexical and syntactic knowledge of written narrative held by well-read-to kindergartners and second graders. *Research in the Teaching of English*, 128-160.

Reese, E., Suggate, S., Long, J., & Schaughency, E. (2010). Children's oral narrative and reading skills in the first 3 years of reading instruction. *Reading and Writing, 23*(6), 627-644.

Rezzonico, S., Goldberg, A., Mak, K. K. Y., Yap, S., Milburn, T., Belletti, A., & Girolametto, L. (2016). Narratives in two languages: Storytelling of bilingual Cantonese–English preschoolers. *Journal of Speech, Language, and Hearing Research*, *59*(3), 521-532.

Roch, M., Florit, E., & Levorato, C. (2016). Narrative competence of Italian–English bilingual children between 5 and 7 years. *Applied Psycholinguistics*, *37*(1), 49-67.

Rodina, Y. (2017). Narrative abilities of preschool bilingual Norwegian-Russian children. *International Journal of Bilingualism, 21*(5), 617-635.

Rojas, R., Iglesias, A., Bunta, F., Goldstein, B., Goldenberg, C., & Reese, L. (2016). Interlocutor differential effects on the expressive language skills of Spanish-speaking English learners. *International journal of speech-language pathology*, *18*(2), 166-177.

Rothman, K. J. (1990). No adjustments are needed for multiple comparisons. *Epidemiology*, 43-46.

Ruxton, G. D. (2006). The unequal variance t-test is an underused alternative to Student's t-test and the Mann–Whitney U test. *Behavioral Ecology*, *17*(4), 688-690.

Scarpino, S. E., Hammer, C. S., Goldstein, B., Rodriguez, B. L., & Lopez, L. M. (2019). Effects of home language, oral language skills, and cross-linguistic phonological abilities on whole-word proximity in Spanish-English–speaking children. *American Journal of Speech-Language Pathology*, *28*(1), 174-187.

Schneider, P., Dub e, R. V., & Hayward, D. (2005). The Edmonton Narrative Norms Instrument (ENNI) | rmdevweb.rehab.ualberta.ca. Retrieved from http://www.rehabresearch.ualberta.ca/enni/

Schrank, F. A., Mather, N., & McGrew, K. S. (2014). Woodcock-Johnson IV Tests of Oral Language. Riverside.

Schwartz, M., & Shaul, Y. (2013). Narrative development among language-minority children: The role of bilingual versus monolingual preschool education. *Language, Culture and Curriculum, 26*(1), 36-51.

Silva, M. J., & McCabe, A. (1996). Vignettes of the continuous and family ties: Some Latino American traditions. *Chameleon readers: Teaching children to appreciate all kinds of good stories*, 116-136.

Simon-Cereijido, G., & Gutiérrez-Clellen, V. F. (2009). A cross-linguistic and bilingual evaluation of the interdependence between lexical and grammatical domains. *Applied psycholinguistics*, *30*(2), 315-337.

Smith, J., & Johnson, D. J. (2019). Parental Perspectives on Education: Mexican and Mexican-American Farmworker Families with Young Children Enrolled in Migrant and Seasonal Head Start. *Journal of Latinos and Education*, 1-16.

Stadler, M. A., & Ward, G. C. (2005). Supporting the narrative development of young children. *Early Childhood Education Journal*, *33*(2), 73-80.

StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.

Streit, C., Carlo, G., Killoren, S. E., & Alfaro, E. C. (2018). Family members' relationship qualities and prosocial behaviors in US Mexican young adults: The roles of familism and ethnic identity resolution. *Journal of Family Issues, 39*(4), 1056-1084.

Tager-Flusberg, H. (1995). 'Once upon a ribbit': Stories narrated by autistic children. *British journal of developmental psychology*, *13*(1), 45-59.

Tomasello, M., & Slobin, D. I. (Eds.). (2004). *Beyond nature-nurture: Essays in honor of Elizabeth Bates*. Taylor & Francis.

Uccelli, P., & Páez, M. M. (2007). Narrative and vocabulary development of bilingual children from kindergarten to first grade: Developmental changes and associations among English and Spanish skills.

Uchikoshi, Y. (2005). Narrative development in bilingual kindergarteners: Can Arthur help?. *Developmental psychology*, *41*(3), 464.

Uchikoshi, Y. (2013). Predictors of English reading comprehension: Cantonese-speaking English language learners in the US. *Reading and Writing*, *26*(6), 913-939.

Uchikoshi, Y., Lindblad, M., Plascencia, C., Tran, H., Yu, H., Bautista, K. J., & Zhou, Q. (2022). Parental Acculturation and Children's Bilingual Abilities: A Study With Chinese American and Mexican American Preschool DLLs. *Frontiers in Psychology*, *12*, 761043-761043.

Uchikoshi, Y., Yang, L., & Liu, S. (2018). Role of narrative skills on reading comprehension: Spanish–English and Cantonese–English dual language learners. *Reading and writing*, *31*(2), 381-404.

Umiker-Sebeok, D. J. (1979). Preschool children's intraconversational narratives. *Journal of Child Language*, *6*(1), 91-109.

U.S. Department of Education (2019a). *English Learners Who Speak Chinese as a Home Language*. Retrieved from https://ncela.ed.gov/files/fast_facts/19-0357_Del4.4_ELsChineseLang_111819_508.pdf

U.S. Department of Education (2019b). *The Top Language Spoken By English Learners (ELs) in the United States*. Retrieved from https://ncela.ed.gov/files/fast_facts/olea-top-languages-fact-sheet-20191021-508.pdf

Wang, M., & Geva, E. (2003). Spelling performance of Chinese children using English as a second language: Lexical and visual–orthographic processes. *Applied Psycholinguistics*, *24*(1), 1-25.

Wang, Q., & Leichtman, M. D. (2000). Same beginnings, different stories: A comparison of American and Chinese children's narratives. *Child development*, *71*(5), 1329-1346.

Witkowska, D., Lucas, L., Jelen, M., Kin, H., & Norbury, C. (2022). Development of complex syntax in the narratives of children with English as an Additional Language and their monolingual peers.

Yan, J. I. N. G., Chin, C. K., & Tse, S. K. (2017). The development of narrative ability in English-Chinese bilingual primary school students in Singapore. *L1 Educational Studies in Language and Literature*, *17*(Open Issue).

Yip, V., & Matthews, S. (2006). Assessing language dominance in bilingual acquisition: A case for mean length utterance differentials. *Language Assessment Quarterly: An International Journal*, *3*(2), 97-116.

Appendix A

Macrostructure Coding

Eight Narrative Events Components (33 sequences)		1 = present 0 = absent
1. Opening	A1. There is a monkey/chimpanzee/gorilla. -once there was a monkey -the monkey is walking	
	A2. Monkey is in the woods. -baby monkey is there	
	A3. Monkey is happy. -monkey is happy	
2. The monkey sees the animals hugging.	B1. Elephants/Calves hugging. -Monkey seeing the elephant and the baby elephant -the elephants are hugging -the elephant hugging the baby elephant -the mommy is giving the little one a hug -the elephant has someone to hug	
	B2. Lizards/chameleons/reptiles/iguanas hugging. -the lizard has someone to hug	
	B3. Snakes/reptiles hugging. -the snake has someone to hug	
	B4. All of the animals were hugging. -all of the animals were hugging	
3. Monkey is alone/is lonely/sad.	C1. Monkey didn't have anyone to hug/Monkey is alone. -he couldn't find his mom -the monkey said he had a family (after saying that the elephant is hugging the baby elephant) -he trying to find his mommy -your mommy's not there! -oh no mommy is not here! -everyone got a mommy, I don't -nobody will hug him -the monkey said "I needed someone to hug"	

	C2. Monkey is sad. -sad, crying, lonely -the monkey misses his dad	
4. The elephant helps the monkey search for his mommy	D1. The monkey asked the elephants to help him search for his mommy. -the monkey asked the elephant to find his mom -the monkey found their friends, the elephants -can you show me where mommy/daddy is?	
	D2. Monkey gets on top of the elephant. -the elephant took his for ride -and the elephant carried him somewhere -the elephant take him -he sat on the elephant head -the monkey got on the elephant and then he slide down so he could leave	
	D3. The elephants help the monkey search for his mommy. -they were looking everywhere for the family -they take him to find his father -and then the elephant said "I'm, going to help you find your mommy" -he found the elephant to help him	
5. Monkey sees animals hugging	E1. Lions/leopards/tigers/cubs hugging. -the lions have to hug	
	E2. Giraffes/calves hugging. -the giraffes have to hug	
	E3. Hippos/calves hugging. -the hippos have to hug	
	E4. All of the animals were hugging -all of the animals were hugging	
6. The monkey is crying and the animals comfort him.	F1. Monkey screams out -he said louder "Where is my mom!" -he screamed very loud -then he started to yell	
	F2. Monkey is crying/he had no one to hug. -crying -and he started to miss him -monkey is crying, like a baby!	

	-he was crying cause he had no one to hug -he was crying because he had non one to give him a hug -and he don't have no one to hug -he was crying because he can't find his father -monkeys cries	
	F3. The animals see the monkey -animals see the monkey crying/listen to him	
	F4. The animals feel sorry/sad/ for the monkey and comfort him -animals feel sorry for him	
7. Monkey reunites with his mommy/daddy.	G1. Monkey's mommy/daddy is on the tree. -she was up in the tree -monkey sees his/her mommy/daddy -there is your mommy! Look at your mommy -his mommy showed up and he didn't see her -and he was up in the tree -the monkey on the page is his father -the money's mamma find her son -then he saw his dad, his dad was gonna hug him -and then he started to see his mommy	
	G2. Mommy calls out/runs for the baby monkey -screams his name "BABY!"	
	G3. Baby monkey calls out/runs for the mommy monkey -he was going to his daddy -he run to his daddy -the little monkey is gonna give a hug to the daddy monkey -"MAMMA!"	
	G4. Monkey loves his mommy/daddy -he is happy again	
	G5. Monkey hugs his mommy/daddy -and he hug him -and then he come back to hug -they hug -and he saw his daddy and they was hugging -then his dad hugged him	

8. Closing	H1. All of the animals were there/ shouting “hug” and/or laughing. -and then everybody shout out -I see monkey, daddy, and all his friends	
	H2. Monkey is grateful -he said “thank you elephant” and he hug him	
	H3. Monkey hugs the elephant -and he hug the elephant	
	H4. All of the animals were hugging -and everybody hug everybody -and everyone was hugging and they was families -all the zoo animals hug	
	H5. All of the animals were happy/acknowledge monkey’s reunion as being happy -they got together	
	H6. Monkey screams out “HUG” -“hug” -“hooray” he said! -then he said “yay”	
	H7. Monkey is happy. -he was so happy, -his loves his papi -”I love you mommy/daddy”	
	H8. Monkeys go home -and they went home -they lived happy ever after -and at the end they liked the animals -the little monkey and the big monkey are leaving to their home -and then they started to get together -they walked home with the hippo and the snake -bye bye, the end, all done, finish	
Total Score		**/33**

Appendix B

Additional Categories

Category	Examples	1 = present 0 = absent
Animals*score only first time per animal	1. Monkeys, chimpanzees, or gorillas 2. Elephants, calves 3. Lizards, frogs, chameleons, or reptiles 4. Snakes, reptiles 5. Lions, leopards, tigers 6. Giraffes 7. Hippopotamuses 8. Animals, zoo animals, zoo *Similar animals like frogs for lizard and snakes were given scores	
Character labeling	Mommy, daddy, baby, brother sister, family friends, best friends, big/small one, another one	
Temporality	And, so, then, and then connecting verbs/actions not nouns	
Direct or indirect Quotes	He said "I want to see my mommy" (Direct) He told the elephant that he was lost. (Indirect)	
Location words	There, over there, here, up, top, under, down	
Additional Total		**/12**

Appendix C

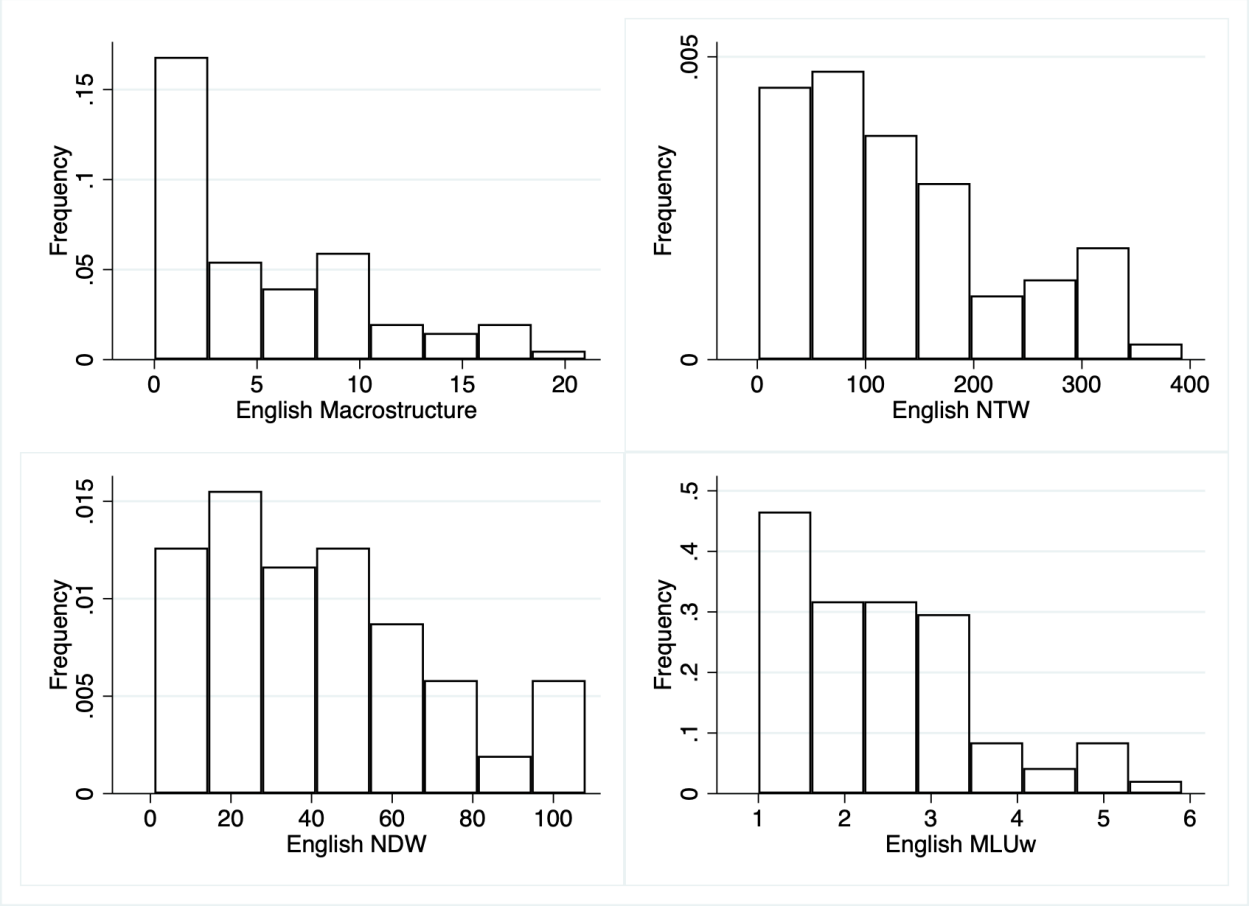

Figure 1. Histograms of English variables by the Chinese group. The histograms show the distributions of four English variables in Table 2 before log transformation was applied. Macrostructure = Total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word.

Appendix D

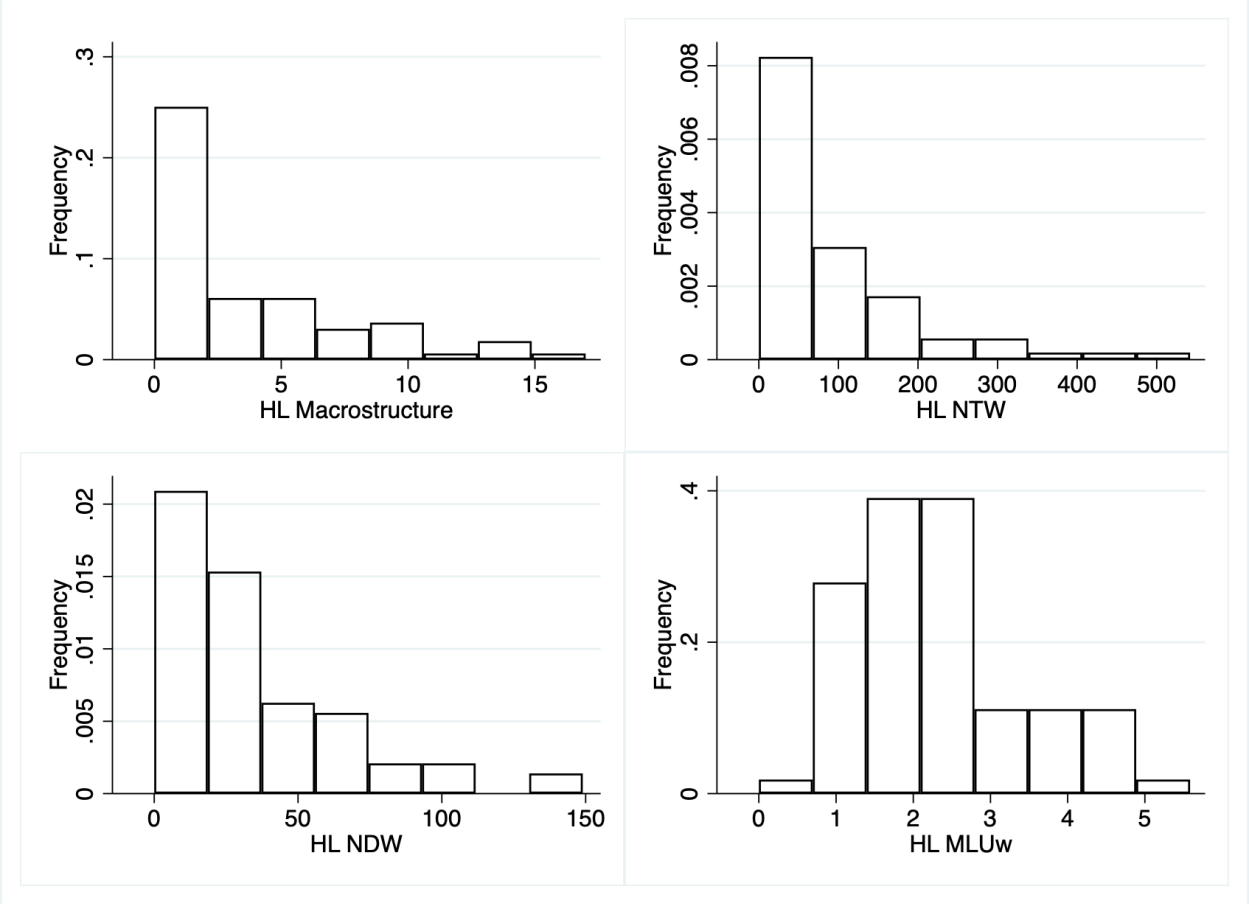

Figure 2. Histograms of HL variables by the Chinese group. The histograms show the distributions of four HL variables in Table 2 before log transformation was applied. Macrostructure = Total 33 points in event components, HL = heritage language, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word.

Appendix E

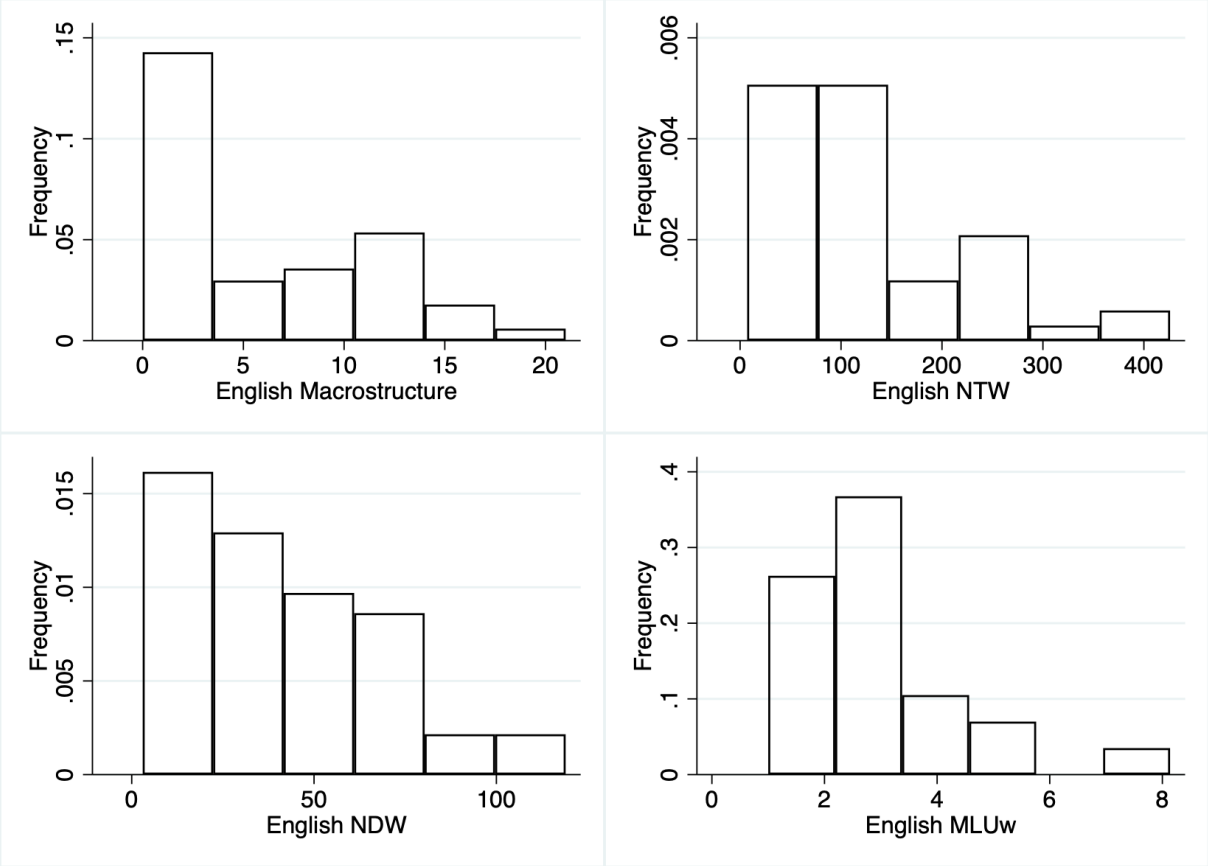

Figure 3. Histograms of English variables by the Spanish group. The histograms show the distributions of four English variables in Table 2 before log transformation was applied. Macrostructure = Total 33 points in event components, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word.

Appendix F

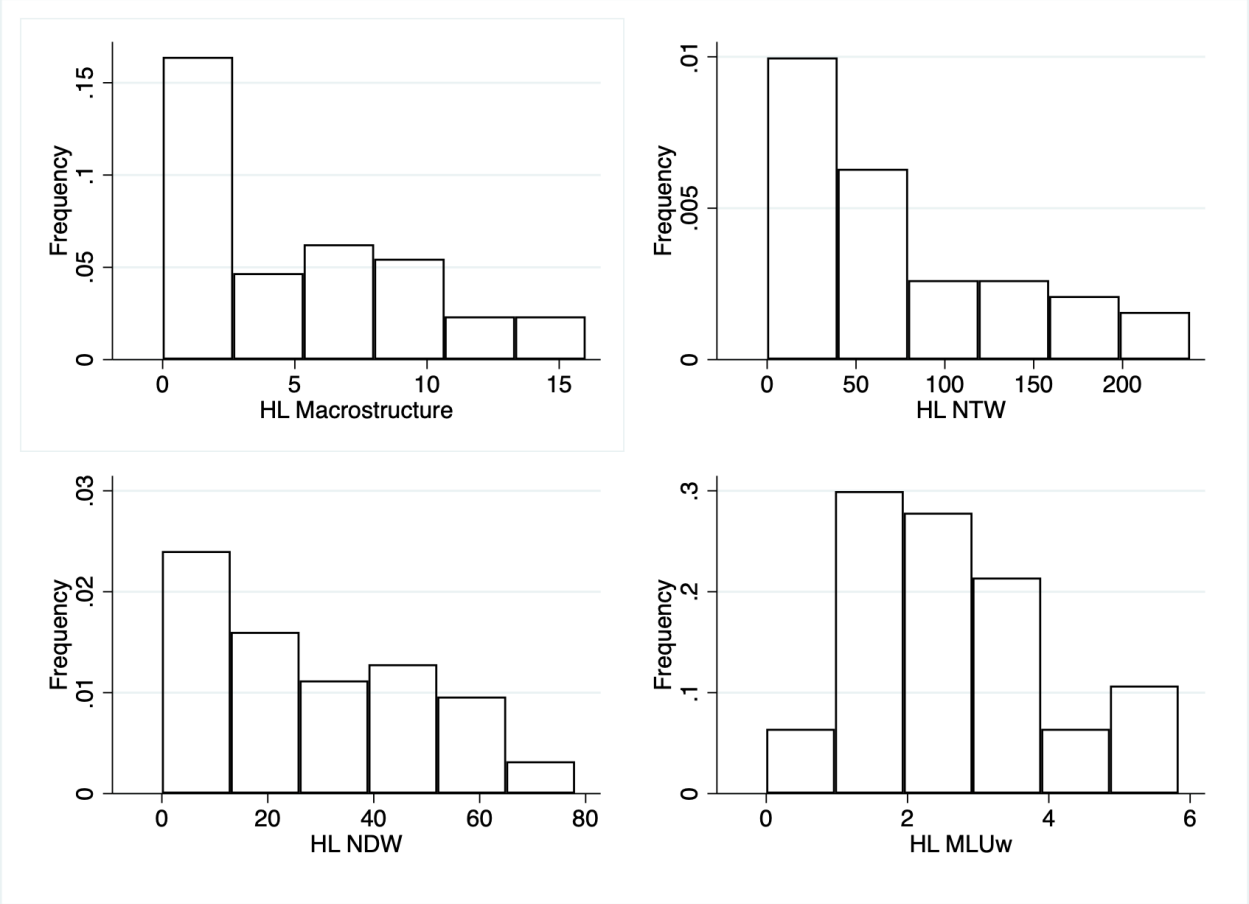

Figure 4. Histograms of HL variables by the Spanish group. The histograms show the distributions of four HL variables in Table 2 before log transformation was applied. Macrostructure = Total 33 points in event components, HL = heritage language, NTW = number of total words, NDW = number of different words, MLUw = mean length utterance in word.

Appendix G

Flier of the Project

PROJECT LEAD
LANGUAGE, EMOTIONS AND DEVELOPMENT

Language, Emotions, & Development (LEAD)

A University of California Research Study for
Dual Language Learners (DLLs) from
Mexican American & Chinese American Families

WHO CAN PARTICIPATE?

- Mexican American or Chinese American children (3 years old) who are currently enrolled in a Head Start center-based program
- With parent permission, teachers of participating children will be invited to participate as well

WHAT IS THE STUDY TRYING TO DO?

- Learn how bilingual development influence children's socio-emotional and academic competence
- Identify factors in children's environment that can promote academic and socio-emotional development

WHAT ARE THE PROCEDURES FOR TEACHERS?

- **Teacher survey:** teachers will fill out a 15-minutes survey (in paper or online) for each participating child

TEACHERS WILL RECEIVE:

- $25 for filling out the teacher survey for each child (up to $200 per teacher)

WITH YOUR APPROVAL...

- **A brief in-person review:** 2 trained researchers will visit centers to examine the child's English and heritage language use in classrooms with minimal intrusion

HOW CAN I LEARN MORE?

Call: (510) 643-5338
Email: qingzhou@berkeley.edu

Lead Researchers
Professor Qing Zhou, UC-Berkeley
Professor Yuuko Uchikoshi, UC-Davis

Appendix H

Parental Consent Form

University of California, Berkeley
Language, Emotions, and Development Study

Wave 1 Phase 2
Project LEAD Outline

1. Introduction & Media Consent (Parent, Child, & Interviewers)

2. Child Assessment (Child & Interviewer)
- Language Assessments
  - Your child will have brief assessments of his/her English and Spanish language fluency.
- Emotion Regulation Task
  - Your child will be playing a bubbles game. These games are designed to study children's emotional reactions.
- Executive Functioning Task
  - Your child will play a game that will be a brief assessment of how they follow instructions and pay attention.

3. Parent-Child Activities Together
- Parent-Child Storybook
  - You and your child will be asked to look at a picture book together.
- Puzzle
  - You will be able to complete a puzzle with your child.

4. Debriefing, Prize, and Good-bye

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

"**Bilingual Children's Language and Emotional Development**"
Research Media Records Release Addendum to Consent Form

Dear Parents,

As part of this project we will make photographic, audio, and/or video recordings of you and your child during participation in the research. Please indicate below (by initialing) what uses of these records you consent to. This is completely up to you. We will only use the records in the way(s) that you agree to. In any use of these records, your name will not be identified.

1. The records can be studied by the research team (including collaborators and transcription services for use in the research project).

Photo _____ Audio _____ Video _____
initials initials initials

2. The records can be used for scientific publications and meetings.

Photo _____ Audio _____ Video _____
initials initials initials

3. The records can be shown in classrooms to teachers and students.

Photo _____ Audio _____ Video _____
initials initials initials

4. The records can be shown in public presentations to non-scientific groups.

Photo _____ Audio _____ Video _____
initials initials initials

5. The records can be used on television and radio.

Photo _____ Audio _____ Video _____
initials initials initials

I have read this form and give my consent for use of the records as indicated above.

_____	_____	_____	_____
Print your name	Sign your name	Date	Your child's name
_____	_____	_____	
Print your name	Sign your name	Date	

CPHS # 2017-06-10096 Page 1 of 1

PROJECT LEAD
LANGUAGE, EMOTIONS, AND DEVELOPMENT

Visa Cash Card Usage Tips

1. Please use the card soon, because monthly service charges will be automatically deducted from the card 3 months after loading
2. Use this card at large departmental stores or supermarkets (e.g. Target, Safeway, Costco, CVS, Walmart, etc.)
3. Swipe the card (instead of inserting) when you use it to pay (does not need a PIN).
4. Track the balance manually (though we recommend you use the money all at once)
5. You may not use this card if the transaction amount exceeds the card's balance
6. Please keep the card.
7. We can load money into this card next year if you choose to participate again

If you have any issues using this card, please do not hesitate to call us at 510-545-6294, and leave a voicemail with your name, reason of your call, and a call-back number.

Visa現金卡使用技巧

1.請在三個月內使用該卡。三个月后此卡将会开动按月的手续费，而从卡上剩下的可用余额扣钱。
2.請在大型百貨商店或超市使用此卡（例如Target, Safeway, Costco, CVS, Walgreens 等）
3.請將此作為信用卡(credit card)使用
4.使用時請刷這張卡
5.請自行記錄餘額（我們建議您一次性使用這筆錢）
6.如果交易金額超過卡的餘額，您不能使用此卡
7.請保留此卡，如果您選擇再次參與，我們可以在明年向這張卡增值

如果您在使用此卡時遇到任何問題，請隨時撥打510-545-6294與我們聯繫並留下語音信箱

Consejos para usar su tarjeta Visa

1. Por favor use su tarjeta lo más pronto posible. Después de tres meses, el sistema empezará a cobrarles una mensualidad
2. Es mejor usar esta tarjeta en sucursales grandes (e.g. Target, Safeway, Costco, CVS, Walmart, etc.)
3. Use esta tarjeta como tarjeta de crédito
4. Pase la tarjeta en lugar de meterla a la máquina de tarjetas cuando valla a pagar (no ocupa PIN)
5. Cheque su saldo de la tarjeta manualmente (les recomendamos usar todo el balance en una vez)
6. No podrá usar esta tarjeta si el precio es más alto que el saldo
7. Por favor guarde esta tarjeta. Si decide participar el próximo año le podemos depositar alli mismo

Si tiene algún problema usando esta tarjeta, por favor comuníquese con nosotros al 510-545-6294, y déjenos un mensaje con su nombre, razon por la llamada, y un numero de contacto

PROJECT LEAD
Culture and Family Lab
University of California, Berkeley

I ACKNOWLEDGE THAT I RECEIVED A $_____ PAYMENT TODAY FOR COMPLETING AN INTERVIEW WITH THE LANGAUGE, EMOTION & CHILD DEVELOPMENT PROJECT.

NAME (PLEASE PRINT): _____

SIGNATURE: _____

STAFF NAME: _____

STAFF SIGNATURE: _____

TODAY'S DATE: _____ FAMILY ID: _____

VISA CASH CARD NUMBER: _____