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Assessment and intervention for bilingual children: A focus on the first language

A Dissertation submitted in partial satisfaction of the requirements
for the degree Doctor of Philosophy

in

Language and Communicative Disorders

by

Quynh Dam

Committee in charge:

San Diego State University

      Professor Giang Pham, Chair
      Professor Sonja Pruitt-Lord
      Professor Yasemin Turan-Qian

University of California San Diego

      Professor Sarah Creel
      Professor Jeanne Townsend

2022

The Dissertation of Quynh Dam is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

San Diego State University
University of California San Diego

2022

DEDICATION

For Chị Diễm.

You inspire me to work hard and do everything with kindness and integrity.

You helped raise us and have never stopped caring for us.

I am blessed to live by your example.

I am blessed to have you as a sister.

Thank you.

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Dam, Q. and Pham, G. T. (submitted for publication). Remote first-language assessment: Feasibility study with Vietnamese bilingual children and their caregivers.

Ho, Tien, Pham, G., **Dam, Q.** (2021). Reading attitudes in Vietnam: Initial study of early school years. *Reading and Writing: An Interdisciplinary Journal.* Available online https://doi.org/10.1007/s11145-021-10181-2

Dam, Q., Pham, G., Potapova, I., & Pruitt-Lord, S. (2020). Grammatical characteristics of Vietnamese and English in developing bilingual children. *American Journal of Speech-Language Pathology*, *29*, 1212-1225. https://doi.org/10.1044/2019_AJSLP-19-00146

Dam, Q., Pham, G., Pruitt-Lord, S., Limon-Hernandez, J., & Goodwiler, C. (2020). Capitalizing on cross-language similarities in intervention with bilingual children. *Journal of Communication Disorders, 87,* 1-13. https://doi.org/10.1016/j.jcomdis.2020.106004

Pham, G. T., Pruitt-Lord, S., Snow, C. E., Nguyen, Y. H. T., Phạm, B., Dao, T. B. T., ... & **Dam, Q. D.** (2019). Identifying Developmental Language Disorder in Vietnamese children. *Journal of Speech, Language, and Hearing Research*, *62*, 1452-1467. http://dx.doi.org/10.1044/2019_JSLHR-L-18-0305 PMCID: PMC6808316.

Pham, G., Ebert, K., Dinh, K.T., & **Dam, Q**. (2018). Nonword repetition stimuli for Vietnamese-speaking children. Manuscript accepted for publication in *Behavior Research Methods, 50,* 1311-1326. http://dx.doi.org/10.3758/s13428-018-1049-0 PMCID: PMC6237661.

Pham, G., Donovan, D., **Dam, Q**., & Contant, A. (2018). Learning words and definitions in two languages: what promotes cross-language transfer?. *Language Learning*, *68*, 206-233. http://dx.doi.org/10.1111/lang.12274

PRESENTATIONS

STATE AND NATIONAL CONFERENCE PRESENTATIONS

*Pham, G., **Dam, Q.**, & Ebert, K. (February, 2021). Vietnamese Assessment Tools Online: Current Research & Clinical Applications*. ASHA CEU invited online seminar presented as part of the 2021 Asian Pacific Islander Speech-Language-Hearing Caucus Speaker Series.

Pham, G., **Dam, Q**., Pham, V., Pham, B., Hoang, H., Pham, Linh., Tran, N., Dao, T., & Hoang, Y. (November, 2020). Proposal Number 20118: Longitudinal Patterns of Developmental Language Disorder in Vietnamese. Proposal accepted as part of an invited symposium co-presented with L. Sheng, A. Wong, G. Pham, P.F. Kan, and K. Ebert, *Developmental Language Disorder across Asian languages in Linguistically Diverse Learners*, at the annual conference of the American Speech-Language-Hearing Association, San Diego, CA (Convention cancelled).

Pham, G., **Dam, Q**., & Ebert, K. (November, 2020). *Proposal Number 11420: Tutorial on New Vietnamese Tools and Their Use in Child Language Assessment.* Proposal accepted at the Annual Convention of the American Speech-Language-Hearing Association, San Diego, CA (Convention canceled).

Lau, P., Harrison, M., Pham, G., **Dam, Q**., Abraham, C., & Ho, T. (November, 2020). Proposal Number 11185: *Is Enjoying Reading Important to be a Good Reader? Lessons from Beginning Readers in Vietnam?* Proposal accepted at the Annual Convention of the American Speech-Language-Hearing Association, San Diego, CA (Convention canceled).

Pham, L., Nguyen, C., Nguyen, L., **Dam, Q**., & Pham, G. (November, 2020) *Proposal Number 11298: Understanding Vietnamese Grammar Patterns using a new Sentence Formulation Task.* Proposal accepted at the Annual Convention of the American Speech-Language-Hearing Association, San Diego, CA (Convention canceled).

To, A., Abraham, C., Douglass, M., Salazar, J., Ramirez, E., **Dam, Q.**, & Pham, G. Proposal Number 10514: *Peer Interaction during Intervention: Spanish-speaking Bilingual Children with and without Developmental Language Disorder.* Proposal accepted at the Annual Convention of the American Speech-Language-Hearing Association, San Diego, CA (Convention canceled).

Dam, Q., & Pham, G. (November, 2019). *Story Retell versus Story Generation in Monolingual Vietnamese Children*. Poster presented at the annual conference of the American Speech-Language- Hearing Association, Orlando.

Nguyen, L., Pham, G., Snow, C., **Dam, Q**. (November, 2019). *The Development of Phonological Awareness in Vietnamese Children*. Poster presented at the annual conference of the American Speech-Language- Hearing Association, Orlando.

Dam, Q., Potapova, I., Pruitt-Lord, S., & Pham, G. (November, 2018). *First and Second Language Acquisition in Vietnamese-English Bilingual Children*. Seminar presented at the annual conference of the American Speech-Language- Hearing Association, Boston.

Potapova, I., **Dam, Q.**, Limon-Hernandez, J., Pruitt-Lord, S., & Pham, G. (November, 2018). *The Role of Cognates in Language Learning: Evidence from Young Bilingual Children*. Poster presented at the annual conference of the American Speech-Language- Hearing Association, Boston.

Dam, Q., Dinh, K.T., & Pham, G. (March, 2018). *Relationships between vocabulary and nonword repetition in Vietnamese-English bilingual children.* Poster presented at the annual conference of the California Speech-Language-Hearing Association, Sacramento.

Pham, G., Ebert, K., & **Dam, Q.** (November, 2017). *Introducing a nonword repetition task for Vietnamese-speaking children.* Poster presented at the annual conference of the American Speech-Language-Hearing Association, Los Angeles.

Pham, G., Donovan, D., **Dam, Q.**, Contant, A., & Cimisliu, M. (November, 2014). *Vocabulary learning & transfer (VoLT): Spanish & Vietnamese-speaking bilingual children with & without language impairment*. Seminar presented at the annual conference of the American Speech-Language- Hearing Association, Orlando.

Pham, G., **Dam, Q.**, & Donovan, D. (November, 2014). *Vocabulary skills in preschoolers learning Vietnamese & English.* Poster presented at the annual conference of the American Speech-Language- Hearing Association, Orlando.

Contant, A., **Dam, Q.**, & Andrianopoulos, M. (November, 2014). *A Systematic literature review regarding the use of telepractice with cultural linguistic diverse populations.* Technical Paper presented at the annual conference of the American Speech-Language- Hearing Association, Orlando.

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Ramirez, E., **Dam, Q.**, Nguyen, K., & Pham, G. (March, 2022). *Involving caregivers in telepractice assessment: Increasing adherence to testing procedures.* Poster presented at the annual Student Research Symposium, San Diego State University.

Nguyen, C., Ramirez, E., **Dam, Q.**, Ho, T., & Pham, G. (March, 2021). *How do Vietnamese-speaking children acquire English grammar?* Poster presented at the annual Student Research Symposium, San Diego State University.

Salazar, J., Gomez, B., Ho, T., **Dam, Q.**, & Pham, G. (March, 2021). *Does proficiency or age influence grammar? A study with Spanish-English bilingual children.* Poster presented at the annual Student Research Symposium, San Diego State University.

Nguyen, L., Nguyen, C., Nguyen, L., **Dam, Q.**, & Pham, G. (February, 2020). *Grammatical Productions in Vietnamese Children using a Novel Sentence Formulation Task.* Poster presented at the annual Student Research Symposium, San Diego State University.

Abraham, C., Harrison, M., Lau, P., **Dam, Q.,** & Pham, G. (February, 2020). *Is Reading Attitude related to Oral Reading ability in Monolingual Vietnamese Speaking Children?* Poster presented at the annual Student Research Symposium, San Diego State University.

Douglas, M., Abraham, C., Ramirez, E., **Dam, Q.**, & Pham, G. (February, 2020). *Peer Interactions in an Intervention for Spanish-speaking Children with and without Developmental Language Disorder.* Poster presented at the annual Student Research Symposium, San Diego State University.

Dam, Q., Limon-Hernandez, J., & Pham, G., Pruitt-Lord, S., & Goodwiler, C. (March 2019). *Can bilingual children capitalize on cross-language similarities to learn new words?* Oral presentation presented at the annual Student Research Symposium at San Diego State University, San Diego.

Dam, Q., Dinh, K.T., & Pham, G. (May, 2018) *Relationships between Vocabulary and Nonword Repetition in Vietnamese-English Bilingual Children.* Oral presentation as an invited panelist presented at the 2018 SDSU annual Speech-Language Awareness and Information Day (SAID).

Dam, Q., Dinh, K.T., & Pham, G. (March, 2018) *Relationships between Vocabulary and Nonword Repetition in Vietnamese-English Bilingual Children.* Poster presented at the annual Student Research Symposium, San Diego State University.

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SDSU College of Health and Human Services Travel Fund 2019
NSSHLA ASHA Scholarship 2019
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ABSTRACT OF THE DISSERTATION

Assessment and Intervention for bilingual children: A focus on the first language

by

Quynh Dam

Doctor of Philosophy in Language and Communicative Disorders

San Diego State University, 2022

University of California San Diego, 2022

Professor Giang Pham, Chair

Bilingualism continues to increase with more than 350 different languages spoken in the United States, and more than 21% of people over the age of five (approximately 66 million people) speaking a language other than English at home (U.S. Census Bureau, 2020). Many bilingual children in the US speak a minority first language (L1) and English as their second language (L2). For a bilingual child, development of both languages are important for different purposes and contexts. Although the L1 is oftentimes not the language of school instruction in

the US, L1 maintenance can lead to closer family cohesion (Park et al., 2012), a stronger sense of identity (Phinney et al., 2001) and overall better health outcomes (Mulvaney-Day et al., 2007). However, bilingual children are at risk for L1 attrition (Pearson, 2007) and this risk is even greater for bilingual children with a language disorder (Ebert et al., 2014).

Speech-language pathologists (SLPs) lack resources to assess and treat bilingual children, especially in the L1. Despite the evidence for best practice, SLPs have resorted to an English-only approach to assessment and intervention (e.g., Caesar & Kohler, 2007, Williams & Mcleod, 2012, Arias & Friberg, 2017). Clearly, more work is needed to improve the quality of care for bilingual children. There are limited resources on how to include L1 in assessment and intervention as compared to the L2 (English). This dissertation contributes to evidence-based resources for SLPs to better incorporate the L1 and, in turn, improve service delivery for bilingual children and families.

INTRODUCTION

Bilingualism continues to increase with more than 350 different languages spoken in the United States, and more than 21% of people over the age of five (approximately 66 million people) speaking a language other than English at home (U.S. Census Bureau, 2020). Seven to ten percent of the child population are at risk for a language disorder (Tomblin et al., 1997) and many of the children will be bilingual speakers. For a bilingual child, a language disorder is characterized by low language skills in the first (L1) and second language (L2). It is best practice to assess and treat bilingual children in both their languages, however, this is not the reality. Many speech-language pathologists (SLPs) lack the skills and resources to provide services in a child's L1 and L2. As a result, SLPs often resort to standardized tests normed on monolingual speakers and intervention conducted only in English (e.g., Caesar & Kohler, 2007, Williams & Mcleod, 2012, Arias & Friberg, 2017). This practice may lead to misdiagnosis of language disorders for bilingual children (Paradis, 2005) and inadequate support for their communication needs.

Disorder within Diversity Framework

To better serve bilingual children we must first understand how language disorders manifest within the context of a child's dialect and language learning environment. This understanding is rooted in the *disorder within diversity* framework (Oetting, 2018). This framework recognizes that children from culturally and linguistically diverse backgrounds may present with both a language disorder and a language difference. For example, instead of categorizing a bilingual child who presents with low language abilities as having either a language disorder or a language difference, SLPs should recognize that they may be experiencing both a language disorder as well as phenomena related to a language difference. In

order to understand patterns of disorder, we first must understand patterns of typical language development. The inclusion of L1 assessment with typically developing children will contribute to our understanding of how language disorders manifest within the bilingual context.

Bilingual Children's First Language

A bilingual child's first language (L1) is vital for their overall development. Bilingual children in the US often start off as monolingual speakers of the L1 (the minority language) and become bilingual when exposed to English (L2, the majority language) when they enter school (Capps et al., 2005). Thus, until they enter school, many bilingual children communicate with family members in the L1 and have little need for English. Many come from immigrant families, in which adult speakers may have limited English proficiency. Thus, the L1 is needed to communicate with family members outside of school. In other bilingual families, parents may speak the L1 and English, yet continue to prioritize L1 use in the home for the transmission of cultural and familial values and beliefs (Liang, 2018). Indeed, second generation American families might value L1 maintenance more than recent immigrants (Young & Tran, 1999). In a variety of contexts, L1 maintenance can lead to closer family cohesion (Park et al., 2012), a stronger sense of identity (Phinney et al., 2001) and overall better health outcomes (Mulvaney-Day et al., 2007).

Because English is the majority language in the U.S. and the language of academic instructions, typically, children are able to learn English rather quickly upon entering school (e.g., Sheng et al., 2011). On the contrary, with minimal to no support of the L1, there will be a risk of L1 loss or L1 attrition, where skills in the L1 do not advance (Anderson, 2012). This usually occurs when children leave their home environment and begin to use the majority language in other contexts, especially in educational settings (Anderson, 2012). This causes a

shift in the amount of input (i.e., what the child hears) and output (i.e., what the child says) in the L1 to the L2. Without adequate support for L1 maintenance, L1 loss/attrition can have a negative impact on the children's overall language performance (Anderson, 2012).

For bilingual children with a language disorder, there may be even a steeper decline (Anderson and Marquez, 2009). Anderson and Marquez (2009) conducted a longitudinal study with 12 Spanish-speaking children with and without a language disorder. They collected language samples and compared the children's use of Spanish grammatical gender. Results showed that the typically developing children maintained correct gender marking across time, whereas, the children with a language disorder showed a change in their pattern of error. They concluded that the children with a language disorder showed a faster rate in L1 loss.

Evidence-Based Practice (EBP)

ASHA positions that SLPs "incorporate the principles of evidence-based practice (EBP) in clinical decision making to provide high quality clinical care" (2005). EBP (Dollaghan, 2007) integrates three equally important sources of information, which includes external evidence, internal evidence, and client characteristics (for review, see Kohnert et al., 2020). External evidence is empirical evidence that ranges in different levels of quality from expert opinion to meta-analyses of randomized clinical trials. Internal evidence is collected from individual clinical cases and consists of objective and subjective measures from the client/family to determine if a process is working as intended and/or how it should be modified. Client characteristics include key aspects of the client and family, beliefs, and informed preferences. Together these sources of information provide SLPs with adequate information for assessment and treatment. Although present in the current literature, more is needed to guide SLPs on how to incorporate L1 into assessment and intervention.

Bilingual Services

Bilingual SLPs are one important component to servicing culturally linguistically diverse populations. They have the ability to provide bilingual services. However, bilingual SLPs are still limited to languages they can service as compared to the many different languages spoken in the U.S. Furthermore, the number of bilingual SLPs are quite limited. According to the American Speech-Language Hearing Association (ASHA, 2021), there are less than 230,000 ASHA-certified SLPs and less than 8% are bilingual service providers. Efforts have been made to increase the number of bilingual SLPs entering the field, however, it is unclear if there will ever be enough to service the increasing number of bilingual children and the variety of languages spoken in the U.S. (Bassow, 2008). This mismatch between the number of bilingual SLPs and the number of bilingual clients leads to questions regarding how bilingual children have been assessed and treated and what could be improved. The following sections highlight key issues in assessment and intervention for bilingual children.

Bilingual Assessment

Although best practice recommends assessment in both the L1 and the L2 for bilingual children (Kohnert et al., 2020), this is not always practiced. Caesar and Kohler (2007) conducted a survey study with 409 SLPs from the Michigan Speech, Language, and Hearing Association (MSHA), of which 130 SLPs indicated being involved in assessing bilingual children. The SLPs were asked about their current procedures for assessing culturally and linguistically diverse populations. Among the 130 SLPs with bilinguals on their caseloads, 98% used procedures that were published as English measures and less than 2% used measures that were published in other languages to assess bilingual students. Seventy-five percent indicated that English was the

language used most frequently during assessment, and only 48% utilized interpreter support with bilingual children.

Although there has been an increase in assessing bilingual children in the L1 over the years, there are still a good amount of SLPs who do not. Arias and Friberg (2017) conducted a follow-up survey study a decade later with 164 SLPs, of which 131 SLPs had bilingual children on their caseloads. This pool of respondents was representative of the nation's population in terms of gender, ethnicity, and caseload type and size (however, it is noted that 73% of respondents were affiliated with at least one SIG). Sixty percent of respondents (n = 77) reported often completing assessments in the L1 and L2, 49% (n = 64) often administered standardized assessments in both languages and 58% (n = 74) often administered informal assessments in both languages. Findings indicate that there have been improvements over the years; however, the inclusion of the L1 in bilingual assessment should be the standard, not optional.

Assessing bilingual children in English only can lead to misdiagnosis of a language disorder. Paradis (2005) examined the expressive language abilities of typically developing bilingual children compared to monolingual children with specific language impairment (SLI). They found that accuracy rates and error patterns produced by the bilingual children were similar to their same-age monolingual peers with SLI. The bilingual children also scored within the range of the clinical population when scored based on a standardized test. If SLPs continue to test bilingual children only in English, a misdiagnosis of a language disorder is inevitable. Furthermore, although informative, standardized measures often introduce bias as they are not often created or normed on specific bilingual populations, which can also contribute to misdiagnoses.

A less biased measure for assessing bilingual children is language sample analysis (LSA), which can be used across a wide variety of cultures and languages. It is considered the gold standard in language assessment for bilingual children (Heilmann et al., 2016). Typically, LSA involves elicitation of a child's language production while the child is engaging with an object or activity with a communication partner (e.g., family member, SLP). LSA measures can include microstructural measures, such as morphosyntax and lexical diversity, and mascrostructural measures, such as production of story elements. However cross-linguistic analyses are not often directly comparable between languages, therefore it is necessary to evaluate the child's production in each language separately (Kohnert et al., 2020). It is noted that a language sample can be obtained with a variety of communication partners (e.g., caregiver, peers) and in a variety of settings (e.g., home, clinic). This flexibility has the potential to increase access to L1 services.

Caregivers could potentially aid SLPs in L1 assessment. Involving caregivers can be a cost-effective and representative way to evaluate a child's development (Du et al., 2020). Furthermore, caregivers can communicate with the child in the L1, which can be advantageous especially in the case where SLPs do not speak the L1. However, very little research has been done to examine the feasibility of involving a caregiver as test administrators. One such study by Du and colleagues (2020) examined Mandarin-English bilingual caregivers' adherence to testing procedures for an online receptive task for their children. They concluded that caregivers could be a potential group of task administrators given explicit support and instructions.

Limited bilingual resources and SLPs can lead to inadequate assessment procedures for bilingual children. SLPs may resort to assessing bilingual children in only the L2, English. This practice can lead to misdiagnosis of a language disorder. Best practice calls for assessment in

both the L1 and L2 for bilingual children. Recommendations for increasing L1 assessment includes language sample analysis (Chapters 1 and 2) and involving caregivers in assessment procedures (Chapter 2).

Bilingual Intervention

Best practice also recommends intervention in both languages for bilingual children (Kohnert et al., 2020). Despite this recommendation, English tends to be the primary language used in intervention with bilingual children (Williams & McLeod, 2012). SLPs may resort to English-only intervention because they are not able to directly support the child's L1 and because more emphasis is placed on supporting the L2, English, the language of academic instruction in the US (Ebert & Kohnert, 2016).

Although commonly practiced, English-only intervention only supports the L2, whereas a bilingual approach can have a positive effect on both the L1 and the L2 (Ebert & Kohnert, 2016). Kohnert and Derr (2004) introduced two general approaches to bilingual intervention: a Bilingual Approach and a Cross-Linguistic Approach. In a Bilingual Approach, the goal is directed towards improving communication in both of the child's languages by targeting common features in both languages. On the other hand, a Cross-Linguistic Approach provides intervention in each language by targeting features that are unique to each language. Both of these approaches are complementary and promote support for both the L1 and L2.

Restrepo et al. (2013) compared the efficacy of Spanish-English versus English-only vocabulary intervention compared to mathematics intervention (control) for 202 bilingual preschoolers with language impairments. The vocabulary intervention consisted of dialogic book reading, hands-on activities, vocabulary book making, story acting, and producing definitions and sentences. Results indicated that the children in the Spanish-English vocabulary intervention

group showed significantly higher receptive and expressive vocabulary gains in Spanish as well as conceptual vocabulary gains than all other groups. The English-only vocabulary intervention only supported English and did not differ from the Spanish-English vocabulary intervention. The authors concluded that bilingual instructions do not hamper gains in the second language, but rather support gains in both the first and second language for bilinguals with language impairments.

More direct approaches to L1 intervention are less studied. Kay-Raining Bird and colleagues (2016) reviewed intervention studies across language disorders, and identified a need for studies examining L1-only intervention in order to better understand the effects of the L1 on both languages. This brings up the concept of cross-linguistic transfer: can skills in one language transfer to the other language (Kohnert et al., 2020). One example of exploring this concept is by capitalizing on similarities across languages as a language learning strategy (Chapter 3).

The study in Chapter 3 includes bilinguals with and without DLD; it is an extension of prior work with typically developing bilingual children. Pham and colleagues (2018) examined cross-linguistic transfer in bilingual groups who spoke either Spanish or Vietnamese as a first language. All bilinguals were matched on English proficiency. For Spanish-English bilinguals, participants were divided into groups with high L1 proficiency (n = 18) and low L1 proficiency (n = 18). Children completed two training sessions conducted in the L1 targeting eight vocabulary words with four words being cognates, words that share form and meaning between English and Spanish. All children improved in the L1 following training. However only the children with high L1 proficiency also improved on untrained translation equivalents in their L2. This study showed the potential for cross-linguistic transfer between Spanish and English for children with high L1 proficiency and that bilinguals with low L1 proficiency might benefit from

direct instruction on cognates. Overall, interventions conducted in the L1 are important for continued development in the L1.

Dissertation Overview

This dissertation investigates strategies to incorporate the first language (L1) into assessment and intervention for bilingual children. Three studies, rooted within the EBP framework (Dollaghan, 2007), are presented. All studies contribute to external evidence and are clinically relevant for assessment and intervention with bilingual children. The studies also utilize internal evidence in the form of objective measures (e.g., language sample measures), and subjective measures (e.g., social validity measures) from children and their families. Lastly, all three studies considered client characteristics, such as language and culture, within assessment (Chapters 1 & 2) and intervention (Chapter 3) procedures.

We first start with assessment. Best practice calls for assessment in both the L1 and L2 for bilingual children (Kohnert et al., 2020). Chapters 1 and 2 consist of two assessment studies with Vietnamese-English bilingual children. Chapter 1 demonstrates effective use of language sample analysis in the L1 and the L2 and how to interpret results within and across languages. Chapter 2 introduces telepractice as a service delivery model and the involvement of a caregiver as two strategies to increase accessibility to L1 assessment. Together, these studies contribute to refining assessment procedures for bilingual children.

Like assessment, best practice for intervention recommends the inclusion of both languages (Kohnert et al., 2020). Studies have shown that a bilingual approach to language services can support both the L1 and L2, whereas L2-only approaches only support the L2 (Ebert & Kohnert, 2016). Chapter 3 is an intervention study conducted in Spanish (L1) with bilingual children with and without a language disorder. This study utilizes cross-linguistic similarities to

increase vocabulary skills. Studies like this show that L1 intervention can have positive effects on overall vocabulary development.

      This dissertation concludes with a general discussion about the three chapters. It highlights clinical implications and future directions for including L1 in assessment and intervention. The studies presented in this dissertation, in alignment with EBP, can help guide SLPs to better service bilingual children.

AJSLP

Research Article

Grammatical Characteristics of Vietnamese and English in Developing Bilingual Children

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Purpose: Defining parameters for typical development in bilingual children's first and second languages can serve as the basis for accurate language assessment. This is the first study to characterize Vietnamese and English grammatical development in a sample of bilingual children.
Method: Participants were 89 Vietnamese–English bilingual children, aged 3–8 years. Children completed story retell tasks in Vietnamese and English. Stories were transcribed and analyzed for grammaticality, error patterns, subordination index, and types of subordinating clauses. Of key interest were associations with age and identifying developmental patterns that were shared across languages or unique to a given language.
Results: Age correlated with more measures in English than in Vietnamese, suggesting that older children had higher

grammaticality and greater syntactic complexity in English than younger children. Children also produced greater syntactic complexity with age in Vietnamese, but not higher grammaticality. There were a set of error patterns shared across languages (e.g., object omission) and patterns specific to each language (e.g., classifier errors in Vietnamese, tense errors in English). While children produced nominal, adverbial, and relative clauses in Vietnamese and English, the proportion of each clause type differed by language.
Conclusions: Results from this typically developing sample provide a reference point to improve clinical practice. Characterizing developmental patterns in sentence structure in Vietnamese and English lays the groundwork for investigations of language disorders in this bilingual population.

A ssessment of language disorders is based on a firm understanding of typical language development. For bilingual children, typicality is characterized by the development of each language as well as phenomena related to interactions between languages such as code-switching and cross-language transfer, or the influence of one language on another (Odlin, 1989). Importantly, the relative strength of each language (i.e., language dominance) can fluctuate depending on age, exposure, and environmental demands (Kohnert, 2010). These moving pieces in bilingual development can contribute to misidentification of a language disorder.

There has been a recent push for a disorder within a diversity framework, which focuses on understanding language disorders within the context of a child's dialect and language learning contexts (Oetting, 2018). This framework recognizes that, instead of presenting with language differences or a language disorder, children from culturally and linguistically diverse backgrounds may present with both. Under this framework, a clinician must understand patterns of language use associated with nonclinical language differences to understand patterns of disorder. However, resources are limited not only in the area of language disorder but also in typical development of different languages. The first step to understanding disorders within diversity is to understand typical development within a given population.

There is now an extensive literature on second language acquisition in childhood (for a review, see Paradis et al., 2011). However, fewer studies are available on first language acquisition of bilingual children. First languages that have garnered much attention include Spanish in the United States (for a review, see Goldstein, 2012), French in Canada (Paradis et al., 2011), and Turkish in the Netherlands (e.g., Leseman, 2000). There continues to be many first languages that are underrepresented in the literature.

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This study introduces Vietnamese to the literature on bilingual grammatical development. Within the last three decades, Vietnamese has risen from being the 13th most spoken language in the United States (other than English) to the fifth most spoken language nationwide (U.S. Census Bureau, 2013). The growing number of Vietnamese individuals in the United States—nearly 2 million—means that clinicians will have an increase in Vietnamese-speaking individuals within their caseloads. One way for clinicians to better serve this growing bilingual population is to compare Vietnamese and English language structures (for a review, see Tang, 2007) to identify potential instances in which one language can influence the other. This study builds on prior linguistic comparisons by analyzing actual patterns produced by developing bilingual children.

There is only a handful of studies on Vietnamese language development. Two monolingual studies have focused on specific features of Vietnamese: classifiers (Tran, 2010) and lexical aspect (Tran & Deen, 2009). One study examined developmental language disorder (DLD) in monolingual Vietnamese (Pham et al., 2019). Studies with Vietnamese–English bilingual children have examined lexical development (Pham & Kohnert, 2014) and cross-language transfer (e.g., Pham et al., 2018). One study used language sample measures to examine longitudinal cross-language associations (Pham, 2016). To our knowledge, there has not been a study that describes grammatical features of children's first and second languages within this bilingual population.

In this study, we aim to set baseline expectations for Vietnamese–English bilingual children through the use of measures that increase with age and that provide us with language-specific information. We begin by discussing the use of language sample measures with bilingual children, specifically grammaticality (GRAM) and subordination index (SI). We then provide an overview of grammatical features of Vietnamese and English to better support later discussions of error patterns.

Language Sample Analysis

Language sample analysis is considered the gold standard in language assessment with bilingual children (Heilmann et al., 2016). When used with other assessment tools, it can provide a more comprehensive assessment of current skills in each language, and this information can readily be applied to treatment planning (Ebert & Pham, 2017). Language samples can be collected from children of various ages, and this assessment method has been used across a wide variety of cultures and languages. Language samples capture an individual's use of language in a real-life setting, and they provide a range of useful information across multiple domains (Ebert & Scott, 2014; Potapova et al., 2018). Language samples can be used to assess the microstructural level (within utterance), using measures such as mean length of utterance and number of different words, and the macrostructural level (across utterances), using measures of story structure and organization (Ebert & Pham, 2017). This study focuses on the microstructural level as

the first step toward understanding grammatical development in Vietnamese–English bilingual children.

For clinical purposes, language sample measures at the microstructural level can provide sufficient information to identify weak language skills. For example, Simon-Cereijido and Gutiérrez-Clellen (2007) found that mean length of utterance in words and an ungrammaticality index discriminated bilingual preschoolers with DLD with 100% specificity. Language sample measures at the microstructural level have also been shown to correlate with standardized tests for linguistically diverse children in their English abilities (Ebert & Scott, 2014), Spanish–English bilingual children in both their English and Spanish abilities (Bedore et al., 2010), and Spanish–English bilingual children with DLD in both their English and Spanish abilities (Ebert & Pham, 2017). In the next section, we discuss two microstructural measures that have been shown to provide useful information about grammatical development in monolingual and bilingual children: GRAM and SI.

GRAM

GRAM reflects whether an utterance follows the syntactic rules and constraints of a given language and is calculated as the number of grammatical utterances over the total number of utterances (Bedore et al., 2010). GRAM and error analysis have been used to describe language samples of monolingual children with typical development (e.g., Eisenberg et al., 2012) and those with impaired language (e.g., Gillam & Johnston, 1992), as well as bilingual children with typical development (e.g., Muñoz et al., 2003) and those with impaired language (e.g., Ebert & Pham, 2017).

Studies with typically developing children have found that GRAM increases with age. In a sample of 22 monolingual English-speaking 3-year-olds, Eisenberg et al. (2012) reported an average GRAM of 71% ($SD = 12\%$). By early school-age years, GRAM approaches ceiling levels for most typically developing English-only speakers. Guo and Schneider (2016) reported GRAM scores for 6- and 8-year-olds with and without language disorder. For their typical samples ($n = 50$ in each age group), they reported average GRAM scores of 91% ($SD = 7\%$) for 6-year-olds and 95% ($SD = 3\%$) for 8-year-olds.

Bilingual children who are in the process of learning English as a second language may differ from their monolingual peers in GRAM scores by age. In an analysis of English language samples from 24 Latino preschoolers, Muñoz et al. (2003) found that 3- and 4-year-olds had an average of 59% GRAM ($SD = 21\%$) and 5-year-olds had an average of 80% GRAM ($SD = 10\%$). However, it was noted that their sample consisted of English-dominant Latino children. English GRAM may be lower for children of the same age range with less English exposure. In a sample of 186 Spanish–English bilingual kindergartners, Bedore et al. (2010) found that 5-year-olds had an average of 46% GRAM in English ($SD = 26\%$) and 68% GRAM in Spanish ($SD = 25\%$). Children in Bedore et al. ranged in English exposure from 20% to over 60%. There was also

a wide range of language abilities represented in this sample. Consistent with a disorder within diversity framework (Oetting, 2018), GRAM scores reported in Bedore et al. may be reflective of a bilingual experience and a wide range of language ability. Ultimately, an understanding of the range of typical GRAM scores in children from culturally and linguistically diverse backgrounds across ages and stages of development is needed to support clinical decision making.

While GRAM summarizes performance across a variety of grammatical structures, it is also possible to derive useful information through examining individual grammatical patterns. This involves coding for specific error types. From studies with English-speaking children, we know that one of the most consistent grammatical errors produced are errors of inflectional morphology (e.g., tense omission and double tense marking; Marchman et al., 1999). In a study of 22 typically developing English-only preschoolers, aged 3;0–3;11 (years;months), Eisenberg et al. (2012) found that the most common errors were with tense marking (30%; e.g., production of bare verbs without tense), other grammatical morphemes (27%; e.g., article omissions), pronominal forms (13%; e.g., gender substitutions), and argument structures (11%, e.g., patient omission with transitive and ditransitive verbs).

Studies that include bilingual speakers have found similar error types in their second language, English. Paradis (2005) examined English grammatical morphology in 24 children who spoke a variety of minority first languages, aged 4–7 years. She found that, while children made errors in both tense and nontense morphemes, errors in tense morphemes were more common. Importantly, Paradis found that even typically developing children make a variety of errors in second language acquisition. Understanding which types of errors to expect from typically developing bilingual children will help future work evaluate profiles of weak skills in each language.

Finally, studies have used GRAM to index language ability. Bedore et al. (2018) were able to use grammatical constructions to accurately identify language disorder in English language learners who used English 40% or more of the time. Relatedly, Bedore et al. (2010) showed that English GRAM and Spanish GRAM were each correlated with performance on the Bilingual English–Spanish Assessment (Peña et al., 2018), a standardized test of language ability. Thus, children's grammatical skills have been shown to be a robust clinical marker of language disorder for Spanish–English bilingual children (Gutiérrez-Clellen & Simon-Cereijido, 2007) and may prove to be useful for other bilingual groups, such as Vietnamese–English children in this study.

SI

Subordination can serve as an index of syntactic complexity as the use of subordination in a sentence is considered to be more sophisticated than merely connecting sentences with a coordination conjunction (Loban, 1976). Two methods of evaluating subordination include SI and analysis of individual types of subordinating clauses. SI is calculated as the total number of clauses over the total number of utterances (Miller & Iglesias, 2012), and this measure is expected to increase with age (Gutiérrez-Clellen & Hofstetter, 1994).

Gutiérrez-Clellen and Hofstetter (1994) reported SI using language samples in Spanish from 77 children in the United States who were in preschool ($n = 28$, $M_{age} = 5.1$), first grade ($n = 26$, $M_{age} = 6.6$), or third grade ($n = 23$, $M_{age} = 8.6$). Using analyses of variance, Gutiérrez-Clellen and Hofstetter found that third graders produced a higher SI than preschoolers. Average SI performance was 1.11 ($SD = 0.13$) for preschoolers, 1.18 ($SD = 0.11$) for first graders, and 1.23 ($SD = 0.13$) for third graders. Notably, these SI values have been replicated in a diverse sample of 129 typically developing monolingual and bilingual first and second graders (Heilmann et al., 2010) who showed an average SI of 1.1 ($SD = 0.1$).

Complementary to SI, syntactic complexity can also be evaluated by the types of subordinating clauses that children employ. Studies on the use of subordinating clauses have primarily focused on the three types found in many languages: adverbial (e.g., "The boy was mad **because the cat ate all the fish**"), nominal (e.g., "The boy saw **what the dog ate**"), and relative (e.g., "The boy ate the food **that he bought**") clauses. Gummersall and Strong (1999) examined subordinating clauses in 30 English-speaking third graders through three different story retell elicitation conditions. They found that children produced high numbers of adverbial clauses followed by nominal clauses than relative clauses in all three conditions.

Gutiérrez-Clellen and Hofstetter (1994) note that subordinating clauses are used by proficient speakers to mark background information, such as providing orientation about the identity of referents (i.e., relative clauses), or to provide cohesion with previous material (i.e., adverbial clauses). They found that the most commonly used subordinating clauses in Spanish-speaking children were adverbial clauses. Children in preschool, first grade, and third grade produced an average of two ($SD = 4.4$), three ($SD = 3.2$), and 5.6 ($SD = 8.2$) adverbial clauses, respectively, in their language samples. Nominal and relative clauses occurred less frequently and in comparable amounts. The use of adverbial clauses suggested that children frequently encoded information about time, place, quantity, or manner within their narratives. However, given the wide variability, the number of adverbial clauses did not increase by grade.

The clause type that seemed to be more sensitive to development was relative clauses. Gutiérrez-Clellen and Hofstetter (1994) reported that third graders produced a higher number of relative clauses than preschoolers or first graders. While both preschool and third-grade children used relative clauses to describe the identity of a reference (e.g., "the frog that has large eyes"), older children used this syntactic structure more effectively. Preschool children's relative clauses did not seem to capture key differences between referents, whereas third graders were able to use relative clauses to isolate a target referent. Information taken from these studies demonstrates the importance of examining

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subordinating clause types across languages in order to understand developmental patterns of syntactic complexity.

Linguistic Constructs in Vietnamese and English

Although Vietnamese and English are highly distinct, these two languages do share some common features in sentence structure. Vietnamese and English both follow the same canonical sentence structure of subject–verb–object (SVO). For example, *Tôi ăn cơm* in Vietnamese exactly translates to "I eat rice" in English. Like English, Vietnamese also allows for multiple clauses within a sentence, and both coordinating and subordinating clauses are possible (D. H. Nguyen, 1997). Given the use of SI, we presently focus on subordinating clauses. In Vietnamese, as in English, subordinating clauses can be divided into three types: adverbial, nominal, and relative (D. H. Nguyen et al., 2018) clauses. An adverbial dause functions as the adverb in the sentence and modifies a verb, a relative clause, or another adverbial clause, as in *cậu bé tức giận tại vì con mèo ăn hết cá* or "the boy was mad **because the cat ate all the fish**." A nominal clause functions as a noun and can take the subject or object position, as in *cậu bé thấy những gì con chó ăn* or "the boy saw **what the dog ate**." Finally, a relative clause functions as an adjective in a sentence (sometimes with the help of a relative pronoun) and modifies the noun or pronoun, as in *cậu bé ăn đồ ăn cậu mua* or "the boy ate the food **that he bought**."

While Vietnamese and English do share some language features, the two languages are more different than they are similar. Vietnamese is an isolating language: There is no inflectional morphology, and grammatical relations are shown exclusively through word order (D. H. Nguyen, 1997). Three features unique to Vietnamese that are relevant to this study include classifiers, pro-drop constructions, and biclausal constructions.

Vietnamese has a complex classifier system that is not easy for nonnative speakers to comprehend and children to fully acquire (Tran, 2010). A classifier is a functional word that precedes a noun and categorizes the noun based on features, such as animacy, shape, or function (Tran, 2010). There is a debate as to the exact number of classifiers in Vietnamese, which ranges from four to over 200 (Pham & Kohnert, 2008). The most common classifiers are *con*, which indicates animacy (e.g., *con mèo/* "cat") and sometimes things that have movement (e.g., *con sông/* "river"), and *cái*, which indicates inanimacy (e.g., *cái bàn/* "table"). Other classifiers indicate certain features of the noun, such as shape (e.g., *quả/* "roundness" as in *quả bóng/* "ball") or size (e.g., *mảnh/* "small" as in *mảnh vải/* "small piece of cloth"; D. H. Nguyen, 1957). Sometimes, classifiers can stand alone when used to replace a known noun. For example, imagine a conversation where the buyer says *Tôi muốn mua những quả táo này* or "I want to buy these apples" and the seller asks *bao nhiêu?* or "how many?" The buyer can then answer *ba quả* or "three [apple classifier, i.e., apples]." Omitting the classifier or using an incorrect classifier makes a sentence ungrammatical.

Like many languages, including Spanish, Vietnamese is a pro-drop language. Vietnamese allows for sentences without a pronoun or subject when the subject is known in context. For example, the following constructions are possible in Vietnamese: *Con mèo thấy một con cá. Bắt cá. Ăn cá. Đi về* "The cat sees a fish. Catches the fish. Eats the fish. Goes home." In this example, *Con mèo* "cat" is the known subject and is carried throughout all the sentences. Therefore, the addition of pronouns or subjects within each sentence is not necessary in Vietnamese. However, if another subject were mentioned within the construction, the speaker would need to insert the new subject before dropping pronouns in subsequent sentences. An omitted pronoun with an ambiguous referent is ungrammatical.

Lastly, Vietnamese has biclausal constructions involving the verbs *bị, được,* and *làm* (roughly translated as "undergo," "obtain," and "do," respectively) followed by nominal clauses. There are no direct translations of these verbs within a biclausal construction. However, they provide a grammatical structure to the sentence. To construct the sentence, *bị, được,* and *làm* have to be the predicate of one clause followed by a nominal clause and cannot stand alone as one clause. Note that these biclausal constructions are different from serial verb constructions (Đồng, 2012), which we coded as monoclausal. *Bị* and *được* constructions are sometimes considered passive constructions (Simpson & Tam, 2013). For example, *Con mèo bị con chó bắt* [cl- cat bị cl- dog catch] "The cat was caught by the dog." Biclausal constructions using *làm* require the second clause to have an unaccusative verb, an intransitive verb whose subject is not responsible for the action (Phan, 2013). For example, *Cậu bé làm rớt trái banh* [The boy làm fall cl- ball] "The boy dropped the ball." In the example, the unaccusative verb *rớt* (to fall) is the predicate of the second clause following the *làm* predicate in the first clause. These biclausal constructions in Vietnamese are very commonly used. The omission or substitution of these verbs can lead to a predicate error within a biclausal construction.

Based on these cross-linguistic differences between Vietnamese and English, there are features that are important in English but are not shared with Vietnamese, such as tense and agreement morphemes (e.g., past tense –*ed*) and nontense morphemes (i.e., plural –*s*, possessive –'*s*, and progressive –*ing*). Because Vietnamese does not have inflectional morphology, grammatical errors that are common in English, such as verb overgeneralization (e.g., *goed*) and double tense marking (e.g., *wented*), are not possible in Vietnamese. Other English features not shared with Vietnamese include definite articles (i.e., *the*) and indefinite articles (i.e., *a/an*). Whereas the notion of (in)definiteness does exist in Vietnamese, its expression often necessitates a quantifier + classifier phrase (e.g., *một con bò* [one cl- cow] "a cow") rather than a one-to-one mapping with English articles (H. T. Nguyen, 2013).

The Current Study

Using language sample analysis, we aim to characterize first and second language development in Vietnamese–English bilingual children. To accomplish this, we use

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GRAM and SI to characterize children's productions in Vietnamese and English. While prior work demonstrates the usefulness of GRAM and SI in characterizing language in children from a variety of backgrounds, the results from this study will help shed light on the use of these measures in a novel population. We present two sets of research questions based on these two measures:

GRAM:

1. What is the relationship with age in each language?
2. Which grammatical patterns do children produce in each language?
3. Which patterns are shared across languages?

SI:

1. What is the relationship with age in each language?
2. Which types of subordinating clauses do children produce in each language?
3. How does the use of subordinating clauses compare across languages?

Similar to previous studies, we anticipate that age will be positively correlated with GRAM (e.g., Muñoz et al., 2003) and with SI (e.g., Gutiérrez-Clellen & Hofstetter, 1994). However, the strength of age correlations in each language may vary as a function of exposure (e.g., Bedore et al., 2010). In other domains such as vocabulary, Vietnamese–English bilingual children have shown positive growth in both languages, with relatively more rapid growth in English (Pham & Kohnert, 2014). Cross-language differences in correlations with age may also occur here in the grammatical domain.

Regarding the types of grammatical patterns produced, we anticipate that children will produce errors that are shared across languages and errors that are specific to each language. Grammatical differences between Vietnamese and English (e.g., Tang, 2007) may dictate which error patterns are possible within each language and which could be shared. Finally, limited information is available on the development of subordinating clauses in bilingual children. From what we know about children who speak English (e.g., Gummersall & Strong, 1999) and Spanish (e.g., Gutiérrez-Clellen & Hofstetter, 1994), we anticipate that children in this study will use the three main types of clauses, namely, nominal, relative, and adverbial. The frequency of each clause type can differ by language and may increase with age.

Method

Participants

Data for the current study were drawn from three existing data sets, which included bilingual children from two geographic regions of the United States, the southwest (Pham & Tipton, 2018) and the northeast (Pham et al., 2018, 2014; see Table 1). Participants were recruited from elementary schools, a community center, and a preschool with high numbers of children for whom the home language

was reported to be Vietnamese. Inclusionary criteria for this study were (a) typical development (verified by parent or teacher report) and (b) completion of the Multilingual Assessment Instrument of Narratives (Gagarina et al., 2012) in both Vietnamese and English.

A total of 89 typically developing children (50 girls) between the ages of 3;3 and 8;10 ($M_{age} = 7;0$, $SD = 1;3$) were included in this study. Across the three studies, parents completed questionnaires to provide information on demographics, language history, and current use (see Table 1). All participants were first-generation Americans: Children had at least one parent who was foreign born. Average maternal education level ranged from high school to some college. The language of first exposure was either Vietnamese or both Vietnamese and English. In Pham and Tipton (2018), parents completed a translated and adapted version of the Bilingual Input–Output Survey (Peña et al., 2018) by phone to evaluate their child's language use and exposure. According to the survey, children on average were exposed to English by the age of 3 years. Average levels of current Vietnamese exposure were 24% input and 17% output in a given week. In Pham et al. (2018, 2014), parents completed a brief questionnaire regarding language history. Parents reported the average age of first exposure to English was 3 years and that Vietnamese was currently used in the home "most of the time" to "all of the time." Specific values for input and output were not estimated.

Procedure

Across the three studies, the same procedures were followed. Prior to conducting each study, research teams received approval from university institutional review boards and approval from the collaborating school district, school, and/or community center. Research teams worked closely with teachers and staffs to recruit participants. Verbal information and written materials about the studies were provided in Vietnamese and in English. Parents provided written consent, and children provided written assent (or verbal assent for young children) to participate.

Participants were individually given a set of assessments in a quiet room in their school or community center by a trained research assistant fluent in the target language (Vietnamese or English). Assessments were separated by language and counterbalanced by the first language of administration. As part of inclusionary criteria, participants in this study completed the Multilingual Assessment Instrument of Narratives in both languages. Each child saw a six-picture sequence and heard a model version of the story read by the examiner. After listening to the model, the child was asked to retell the story. Following procedures for use with bilinguals outlined in Gagarina et al. (2012), two stories with the same format (i.e., the Cat Story or the Dog Story) were used. The order of the stories was counterbalanced by language (e.g., a child who retold the Dog Story in English would retell the Cat Story in Vietnamese) to equally divide story formats across languages (i.e., Vietnamese Cat and English Dog; Vietnamese Dog and

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Table 1. Participant information presented in means and standard deviations.

Studies	Pham & Tipton (2018)	Pham et al. (2018)	Pham et al. (2014)	All
Geographic region	Southwestern United States	Northeastern United States	Northeastern United States	
n	57	23	9	89
Sex	35 female, 22 male	11 female, 12 male	4 female, 5 male	50 female, 39 male
Age (years;months)	5;9–8;6	5;11–8;10	3;3–5;4	3;3–8;10
Grade	Kindergarten to 2nd	1st to 2nd	Preschool	Preschool to 2nd
Mother's education	1.36 (0.98)[a]	1.23 (1.02)[b]	0.78 (0.83)	1.25 (0.98)
Language of first exposure	1.09 (1.01)	1.83 (0.39)	1.78 (0.44)	1.35 (0.91)
Age of English onset	1.94 (1.50)[c]	3.88 (1.43)[d]	2.00 (1.20)	3.59 (1.69)
Vietnamese use at home[e]	0.20 (0.10)[a]	1.48 (0.51)	1.44 (0.53)	1.47 (0.51)

Note. Mother's education: 0 = less than high school, 1 = high school, 2 = associate degree, 3 = college, and 4 = graduate. Language of first exposure: 0 = English, 1 = both, and 2 = Vietnamese. Vietnamese use at home: 1 = all the time, 2 = most of the time, 3 = some of the time, and 4 = never.

[a]Fifteen missing. [b]One missing. [c]Twenty-six missing. [d]Three missing. [e]Vietnamese use was calculated as the average of weekly input and output in Pham and Tipton (2018) and was calculated using a single parent survey item in Pham et al. (2018, 2014).

English Cat). Story retells were audio-recorded and later transcribed and analyzed using the Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2012). A trained research assistant fluent in the target language transcribed the stories using SALT conventions (e.g., excluding mazes and unintelligible words and phrases). A second trained research assistant then relistened to all samples to check for transcription accuracy (for a review of reliability procedures, see Ebert & Pham, 2017).

For all transcripts, utterances were divided into modified communication units (C-units), which are recommended for analyzing samples from bilingual children (Miller & Iglesias, 2012). Given that Vietnamese is a pro-drop language, modified C-units were used to account for the normal occurrence of subject deletion (Heilmann et al., 2016).

Measures

Language transcripts were analyzed using two measures: GRAM and SI.

GRAM

To calculate GRAM, each utterance was coded as grammatical ([GRAM]) or ungrammatical ([UNGRAM]) in SALT. GRAM was calculated as the number of grammatical C-units over the total number of modified C-units. Ungrammatical utterances were further coded to reflect different types of errors. For example, an utterance with an object omission would be followed by the codes "[UNGRAM] [ObjO]." Grammatical patterns were then calculated as the percentage of each error type using the equation: [total number of occurrences for one error type / total number of errors] × 100.

SI

SI, a measure of syntactic complexity, was coded and calculated using SALT software. Two of the authors coded individual utterances with the determined number of clauses. The utterances were coded as *[SI-1]* if there was one clause, *[SI-2]* if there were two clauses, and so on. The

SALT software generated the SI composite score as the total number of clauses over the total number of modified C-units based on the coding system. The utterances with two or more clauses were further analyzed into three different types of subordinating clauses: adverbial, relative, and nominal (cf. Gummersall & Strong, 1999). Subordinating clauses were then calculated as the percentage of each clause type using the equation: [total number of occurrences for one clause type / total number of clauses] × 100.

Reliability

Reliability was completed for 20% of the language samples (18 samples in each language) for GRAM and SI in Vietnamese and in English. Reliability was calculated as the total number of agreement (on GRAM score or SI score) over the total number of utterances. Two of the authors fluent in Vietnamese scored GRAM and SI for the Vietnamese language samples. Reliability in Vietnamese for GRAM was 92%, and reliability in Vietnamese for SI was 95%. Two of the authors scored GRAM and SI for the English language samples. Reliability in English for GRAM was 98%, and reliability in English for SI was 100%.

Results

The goal of this study was to identify developmental patterns of Vietnamese and English using language samples from a wide age range of bilingual children. We compared measures of GRAM and SI in each language and across languages. Table 2 displays descriptive statistics for GRAM and SI by age.

GRAM

1. What is the relationship with age in each language? Pearson correlations were conducted to understand the relationship between age and GRAM for each language. As shown in Figure 1, correlations between age and GRAM were not significant in Vietnamese ($r = -.137$, $p = .201$)

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Table 2. Descriptive statistics.

Measure	Variable	Age (years)				All (N = 89)
		3–5 (n = 15)	6 (n = 20)	7 (n = 29)	8 (n = 25)	
Vietnamese GRAM (%)	M (SD)	65.4 (23.2)	72.9 (23.1)	61.4 (27.1)	58.2 (32.8)	63.8 (27.6)
	Range	20–100	8–100	8–100	0–100	0–100
Vietnamese SI	M (SD)	0.90 (0.30)	1.01 (0.16)	1.03 (0.13)	1.08 (0.15)	1.02 (0.19)
	Range	0.20–1.40	0.46–1.30	0.78–1.46	0.88–1.53	0.20–1.53
English GRAM (%)	M (SD)	51.0 (35.6)	50.7 (24.5)	71.5 (26.3)	74.2 (19.2)	64.1 (27.7)
	Range	0–100	18–93	18–100	30–100	0–100
English SI	M (SD)	0.79 (0.37)	1.13 (0.13)	1.14 (0.17)	1.18 (0.15)	1.09 (0.24)
	Range	0–1.21	0.85–1.39	0.86–1.69	0.80–1.40	0–1.69

Note. GRAM = grammaticality; SI = subordination index.

but were significant in English ($r = .356$, $p = .001$). Thus, while older children demonstrated higher rates of GRAM in English, this did not hold when examining their performance in Vietnamese.

2. Which grammatical patterns do children produce in each language? Participants (i.e., 9 in Vietnamese and 6 in English) in this study consisted of typically developing children, and some participants had GRAM scores of 100%. Nonetheless, errors were made in both languages (see Tables 3 and 4). The most common errors (over 10%) made in Vietnamese were classifier errors (37%), object omission errors (15%), and subject omission errors (15%). Other grammatical patterns that are unique to Vietnamese include noun phrase errors (9%) and predicate errors (4%; see examples in Table 3). The most common errors (over 10%) made in English were tense errors (57%) and verb omission errors (14%). Other errors unique to English included article errors (6%), nontense morpheme errors (5%), verb overgeneralization (3%), and *to*-infinitive errors (< 1%; see examples in Table 4).

3. Which patterns are shared across languages? While Vietnamese and English differ in numerous grammatical features, some are shared. As shown in Figure 2, some error patterns were present in both languages: clause omission, conjunction errors, object omission, prepositional phrase errors, pronoun errors, subject omission, verb omission, and word order errors (see Tables 3 and 4 for examples). Although

these errors are shared between Vietnamese and English, they did not occur to the same extent in each language. Object omission and subject omission were more common in Vietnamese, whereas verb omission was more common in English. Prepositional phrase errors occurred above 8% and, to a similar degree, in both languages. Word order errors, clause omission, conjunction errors, and pronoun errors were the least frequent across languages.

SI

1. What is the relationship with age in each language? Pearson correlations were conducted to examine the relationship between age and SI for each language. As shown in Figure 3, age was significantly correlated with SI in Vietnamese ($r = .376$, $p < .001$) and SI in English ($r = .649$, $p < .001$). Thus, older children demonstrated greater syntactic complexity than younger children in both Vietnamese and English.

2. Which types of subordinating clauses do children produce in each language? Recall that the same subordinating clauses are possible in both Vietnamese and English. These subordinating clauses include nominal, adverbial, and relative clauses. In Vietnamese, subordinating clauses included nominal clauses (68%), adverbial clauses (16%), and relative clauses (15%). In English, subordinating clauses consisted of nominal clauses (57%), adverbial clauses

Figure 1. Scatter plots of age and grammaticality of Vietnamese (left) and English (right). The correlation between age and grammaticality was not significant in Vietnamese ($r = -.137$, $p = .201$) and positive in English ($r = .356$, $p = .001$).
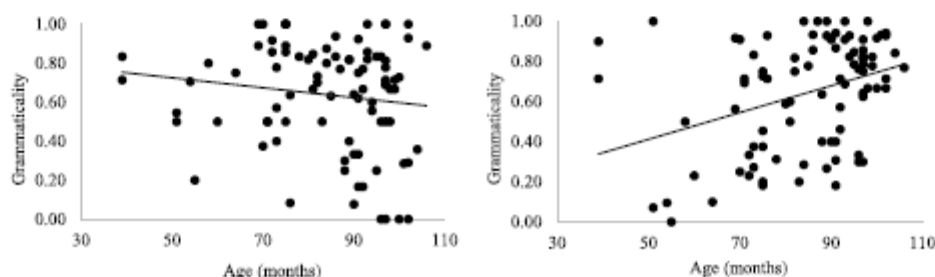
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Table 3. Types of grammatical errors produced in Vietnamese.

Error	Examples	Raw	%
Classifier error	Child: Bóng bị rơi xuống nước. Correct: **Quả** bóng bị rơi xuống nước. Gloss: [(missing classifier) ball undergo fall down water]	106	37.46
Object omission	Child: Con cá đấy muốn lấy. Gloss: [Classifier + cat that wants take (missing direct object)]	43	15.19
Subject omission	Child: Lấy được quả bóng. Gloss: [(Missing subject) take able classifier + ball]	42	14.84
Noun phrase error	Child: Anh lấy quả bóng. Correct: Anh **trai** lấy quả bóng. Gloss: [Male (missing noun) take classifier + ball]	26	9.19
Prepositional phrase error	Child: Con mèo bị ngã cây. Correct: Con mèo bị ngã **vào** cây. Gloss: [Classifier + cat undergo fall (missing preposition into) tree]	24	8.48
Verb omission	Child: Con mèo bị ở trong cái cây đó. Gloss: [Classifier + cat undergo (missing verb) at in classifier + tree that]	12	4.24
Word order	Child: Còn con mèo vui vì tại được ăn. Correct: Còn con mèo vui **tại vì** được ăn. Gloss: [And classifier + cat happy because able eat]	12	4.24
Predicate error	Child: Cậu bé rơi quả bóng. Correct: Cậu bé **làm** rơi quả bóng. Gloss: [Boy (missing predicate do) fall classifier + ball]	10	3.53
Clause omission	Child: Trước khi cậu bé lấy quả bóng. Gloss: [(Missing clause) before boy take classifier + ball]	6	2.12
Conjunction error	Child: Có một con mèo một con bướm. Correct: Có một con mèo **và** một con bướm. Gloss: [There exist one classifier + cat (missing conjunction and) one classifier+ butterfly]	1	0.35
Pronoun error	Child: Con chó và con chuột nó nghịch. Correct: Con chó và con chuột **chúng nó** nghịch. Gloss: [Classifier + dog and classifier + mouse (missing pronoun they) it play]	1	0.35
Total		283	100

Note. Examples include a child's utterance (Child), the adult target when applicable (Correct), and the literal translation in English (Gloss). Target grammatical features are in bold when applicable.

(37%), and relative clauses (6%). Thus, children produced all clause types within their language samples with high numbers of nominal clauses in both languages.

3. How does the use of subordinating clauses compare across languages? To address this question, a chi-square test of independence was used to examine the relation between language and types of clauses. Results indicated a significant association between language and clause type, $\chi^2(2, N = 89) = 16.80$, $p < .001$, meaning that the pattern of clauses produced in each language was significantly different. Paired-samples t tests with Bonferroni correction (i.e., p value of .05 divided by three planned tests is equal to $p = .017$) were used to explore the patterns of subordinating clauses within each language. In Vietnamese, children produced more nominal clauses than both adverbial clauses and relative clauses with equal amounts of adverbial clauses and relative clauses, and in English, children produced more nominal clauses than adverbial clauses and relative clauses and more adverbial clauses than relative clauses (see Figure 4).

Discussion

Speech-language pathologists lack resources to best serve children from culturally and linguistically diverse backgrounds (e.g., Caesar & Kohler, 2007). As a field, we are making advances in this area (e.g., Ebert & Pham, 2017; Kohnert, 2010; Potapova et al., 2018). However, more information is needed to continue this progress, particularly for children who speak languages that are underrepresented in the literature. In this study, we characterize typical language development in Vietnamese and English for bilingual children between the ages of 3 and 8 years. We used language sample analysis, an approach that is appropriate for children from a wide range of backgrounds. Specifically, we used GRAM and SI to describe grammatical development in each language and shared patterns across languages. GRAM and SI have been found to be sensitive to age/development in English, Spanish, and other languages (e.g., Bedore et al., 2010; Guo & Schneider, 2016; Gutiérrez-Clellen & Hofstetter, 1994; Muñoz et al., 2003), and this study examines their utility in Vietnamese and English.

Grammatical Patterns

As children in this sample were typically developing, most utterances produced were grammatically correct. When errors were produced, they included errors specific to Vietnamese and errors specific to English, as well as

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Table 4. Types of grammatical errors produced in English.

Errors	Examples	Raw	%
Tense error	Child: He jump to get the ball. Correct: He **jumped** to get the ball.	260	56.52
Verb omission	Child: The cat the fish. Correct: The cat **[verb]** the fish.	63	13.70
Prepositional phrase error	Child: The boy put the bucket in the floor. Correct: The boy put the bucket **on** the floor.	39	8.48
Article error	Child: He saw ball. Correct: He saw **the** ball.	27	5.87
Nontense morpheme errors	Child: The dog ate the bag of sausage. Correct: The dog at the bag of **sausages**.	22	4.78
Verb overgeneralization	Child: He goed fishing. Correct: He **went** fishing.	13	2.83
Object omission	Child: The cat took. Correct: The cat took **[direct object]**.	9	1.96
Word order	Child: The boy climbed the tree up. Correct: The boy **climbed up the tree**.	8	1.74
Clause omission	Child: Before the boy sees the cat. Correct: **[clause]** before the boy see the cat.	6	1.30
Pronoun error	Child: The boy saw he. Correct: The boy saw **him**.	6	1.30
Subject omission	Child: Ate a fish. Correct: **[subject]** ate a fish.	3	0.65
To-infinitive error	Child: He wanted eat the fish. Correct: He wanted **to** eat the fish.	2	0.43
Conjunction error	Child: There is a dog a mouse. Correct: There is a dog **and** a mouse.	2	0.43
Total		460	100

Note. Examples include a child's utterance (Child) and the adult target (Correct). Target grammatical features are in bold when applicable.

errors that were present in both languages. Consideration of these errors provides a window into typical language development in Vietnamese–English bilinguals. Most Vietnamese-only patterns included omission errors of classifiers, objects, or subjects. Most English-only patterns included errors with verb tense or verb omission. Because Vietnamese and English have highly distinct grammatical systems, it is not surprising that there were different areas of difficulties within each language.

Previous studies demonstrate that inflectional morphology, especially tense and agreement markers, is an area of difficulty for bilingual children learning English (Bedore et al., 2018; Gutiérrez-Clellen & Simon-Cereijido, 2007). Tense and agreement markers in English include third-person singular ("The cat jumps"), past tense ("The cat jump**ed**"), copula *BE* ("The cat **is** happy"), auxiliary *BE* ("The cat **is** jumping"), and auxiliary *DO* ("The cat **does** jump"). Across these categories, not all appear to be equally challenging for bilingual speakers. English language learners from a variety of first language backgrounds demonstrate relative strengths in using copula and auxiliary *BE* compared to the remaining tense and agreement morphemes (Bedore et al., 2018; Paradis & Blom, 2016; Potapova & Pruitt-Lord, 2019). To some extent, this may be associated with linguistic structures in the first language. For example, both copula and auxiliary *BE* have similar counterparts in Spanish, whereas the remaining English morphemes do not (Potapova & Pruitt-Lord, 2019). However, even children

from language backgrounds without tense marking show a pattern of precocious *BE* (Paradis & Blom, 2016). This is similarly borne out in the current sample: English tense errors—mostly representing errors in the bound morphemes of third-person singular and past tense (e.g., "The cat **want** to eat the butterfly")—were the most common error type, as compared to verb omissions, which typically included copula or auxiliary *BE* (e.g., "The cat hungry"). Much like children who speak other first languages and are learning English as the second language, the bilingual sample in this study also showed difficulties in tense and agreement morphology. Additionally, the absence of tense morphology in Vietnamese may have contributed to this error pattern. To better understand the role of the first language in these surface errors, continued comparisons between bilingual speakers with different language backgrounds are needed (see Paradis & Blom, 2016).

On the other hand, Vietnamese has a complex classifier system (i.e., words that provide information about subsequent nouns) that English does not have. Children in this bilingual sample showed the most difficulties in using classifiers. In most cases, classifiers were omitted in required contexts. In relatively fewer cases, children used the classifier for inanimacy *cái* to substitute for the animacy classifier *con*. The inanimate classifier *cái* is also a general classifier that can be used (although not preferred) in place of more specific classifiers for shape such as *quả* (roundness) or *cuộn* (rolled; D. H. Nguyen, 1957). Monolingual Vietnamese

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Figure 2. Types of errors demonstrated by the Vietnamese–English participants, including errors specific to Vietnamese, errors specific to English, and errors shared across languages.
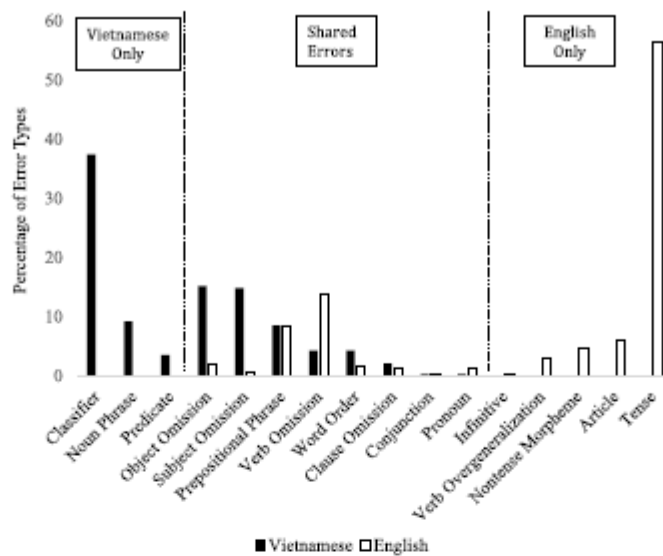
toddlers and preschoolers have also been shown to demonstrate errors of classifier omission and have used the general *cái* as a placeholder (Tran, 2010). Vietnamese error patterns within the present bilingual sample seem to reflect early language acquisition patterns of monolingual Vietnamese speakers.

Errors with classifiers have also been found in bilingual children who speak Mandarin and English. Hao et al. (2018) examined 21 Mandarin–English bilingual children, aged 4–9 years, on their use of various language elements. Due to the complex nature of Mandarin classifiers, children showed low production of classifiers and overgeneralization of the general classifier *ge*. Overuse of the general classifier *cái* in Vietnamese seems to parallel with these previous findings of Mandarin–English children.

Relations With Age

For our participants, we found that older children produced higher GRAM in English, but not in Vietnamese. Correlations found here suggest that bilingual children are producing more grammatically accurate sentences in English with age (i.e., increased from an average GRAM of 51%–74%; see Table 2). Average GRAM in English for 3- to 5-year-olds (51%; $SD = 35.6$) was similar to 3- to 4-year-olds in Muñoz et al. (2003) and to 5-year-olds in Bedore et al. (2010). Similar to the language samples in Spanish from 5-year-olds in Bedore et al. (2010), average GRAM in Vietnamese was 64% ($SD = 23.2$), and this percentage seemed to be consistent across children from preschool through the early school years (see Table 2). The lack of a correlation between age and GRAM in Vietnamese is an indication

Figure 3. Scatter plots of age and subordination index of Vietnamese (left) and English (right). Age and subordination index were positively correlated in Vietnamese ($r = .376$, $p < .001$) and in English ($r = .649$, $p < .001$).
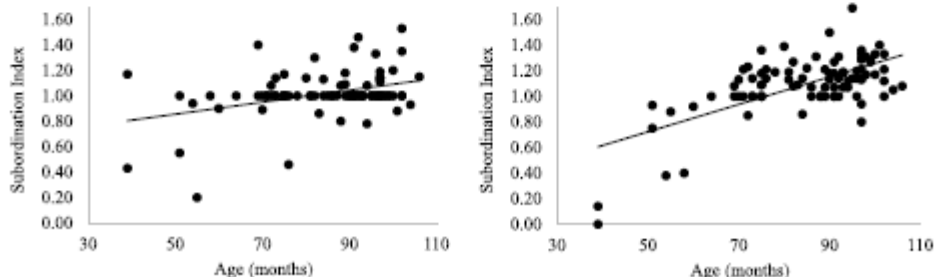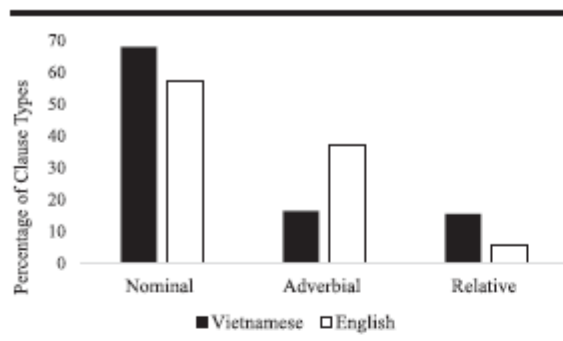
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Figure 4. Types of subordinating clauses produced in Vietnamese and English.

of a plateau effect in children's first language (see Figure 1). A large body of work reveals that children who speak a minority first language in the United States will show rapid increases in their second language (i.e., English) abilities upon entering school while also experiencing first language attrition (Seliger & Vago, 1991). First language attrition can take the form of positive growth, albeit slower than that of English (Pham & Kohnert, 2014), a plateau of first language skills (Pham & Tipton, 2018), or negative growth or loss (Fillmore, 1991). The rate of growth in the first language can depend in part on environmental support such as bilingual schooling opportunities (Castilla-Earls et al., 2019; Pham & Kohnert, 2014) as well as first language practices at home and in the community (Paradis, 2011; Pham & Tipton, 2018). Correlational results present in this sample are an important reminder that, even for typically developing children, the minority first language is susceptible to attrition. Systematic support of the first language is needed for continued development (for a review, see Kohnert, 2013).

In contrast to the cross-linguistic differences in GRAM, there was a positive correlation between age and SI in both languages. These findings indicate that children use more complex sentence structures with age in Vietnamese and English. The relative strength of the correlations was stronger in English than Vietnamese (see Figure 3), suggesting that increases in SI may be more prominent in English. Children in this study also showed smaller increases in SI by age in Vietnamese (see Table 2) when compared to Spanish-speaking children from Gutiérrez-Clellen and Hofstetter (1994). This is possibly due to Spanish and English being typologically more similar than Vietnamese and English. Correlational analysis within this cross-sectional sample mirrors findings from previous longitudinal studies of a separate sample of Vietnamese–English bilingual children who showed rapid growth in English and relatively slower but positive growth in Vietnamese (Pham, 2016; Pham & Kohnert, 2014). Children in the study also used a variety of subordinating clauses in their story retell. Nominal, relative, and adverbial clauses were used in both languages, and the similarities in these subordination clause types could be utilized in intervention.

Clinical Implications

Analyzing GRAM and SI in language samples of bilingual children has implications for assessment and treatment. Information gathered from these measures can help clinicians gain a more comprehensive understanding of bilingual children's first and second language development. From a practical standpoint, GRAM and SI are easy to obtain and quick to score. GRAM requires a simple judgment of "grammatical" or "ungrammatical" for each utterance produced in a sample, and the calculation of SI is semi-automated by language transcription software, including SALT. Clinically, both measures can provide specific information on bilingual children's grammar and sentence structures in both languages.

Assessment of Vietnamese–English Bilingual Children

Language samples should be used to assess children from culturally and linguistically diverse backgrounds, including Vietnamese–English bilingual children. There are many ways to elicit language samples (Southwood & Russell, 2004), including story retell, which gives children the opportunity to become familiar with the story before reproducing it. Samples should be elicited in both languages for a comprehensive assessment of children's overall abilities (for a review, see Kohnert, 2013). If the clinician is not fluent in Vietnamese, the use of an interpreter is advised (for a review, see Langdon & Saenz, 2015). Recording the child's production of the story retell allows for transcription and analysis. Once transcribed, the clinician can proceed to coding the transcript for GRAM and SI and to analyzing samples for grammatical patterns and use of subordinating clauses. GRAM, in particular, is relatively easy for a native speaker or interpreter to judge (for detailed instructions on how to work with an interpreter to analyze a language sample, see Pham, 2015).

Clinicians working with Vietnamese–English bilingual children can compare GRAM and SI between languages, as well as their specific grammatical patterns and use of subordinating clauses, to the typically developing children in this study to better interpret their overall language skills (see age-based averages in Table 2). Across languages, prior research suggests that children with DLD struggle with similar areas of language as children who are typically developing (for a study on Vietnamese DLD, see Pham et al., 2019). Based on current work, we may expect that Vietnamese–English bilingual children with DLD would struggle with similar grammatical features as found in our typical sample, albeit with a greater number of errors overall. In this case, language-specific errors could include classifiers in Vietnamese and tense marking in English. Finally, it is important to take into account first language attrition in assessment. From a disorder in diversity framework (Oetting, 2018), error patterns can reflect a language difference, disorder, or both.

Treatment of Vietnamese–English Bilingual Children

Identifying patterns that may be language specific or shared across two languages can serve as a basis for treatment planning. Clinicians can tailor treatment activities

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to target language-specific errors, as well as involve multiple stakeholders to practice targets in each language, in order to maximize efficiency. For example, we found that most of the Vietnamese-specific errors related to classifiers. Therefore, increasing accurate use of classifiers will make a substantial impact on children's overall Vietnamese GRAM. Using what we know about classifiers, clinicians can explicitly teach the rules for using classifiers and practice using classifiers in treatment sessions. A simple classifier activity could be asking children to count objects to elicit classifiers in the required grammatical context of quantifier + classifier phrase (e.g., một con bò [one cl- cow] "a cow"). These types of counting activities provide children the opportunity to practice using classifiers in a natural context.

Clinicians can also capitalize on the common features of Vietnamese and English to potentially bolster GRAM in both languages. From our study, there were a number of grammatical patterns produced in both languages (see Figure 2). For example, word order errors were produced in both languages. We know that Vietnamese and English share the same canonical sentence structure of SVO. Intervention can target SVO sentences in both Vietnamese and English. Recognizing common features within two languages can be a useful tool for clinicians who are not fluent in a child's first language. If treatment in the first language cannot be conducted in treatment sessions, the clinician can work on common features in English and coordinate practice in the first language via home program and parent training (for a review, see Kohnert, 2013). High-quality educational resources are available online (e.g., National Resource Center for Asian Languages, 2019) and can readily be incorporated in treatment.

Concluding Remarks

Working across cultures and languages is both challenging and rewarding. It is important that clinicians have access to tools and strategies that can accurately describe language abilities and serve as a guideline for treatment planning. For bilingual children, skills and performance in both languages should be considered for an accurate and comprehensive assessment. Using language sample analysis, specifically GRAM and SI measures (see Table 2), can provide detailed information on a child's grammar and sentence structure.

Acknowledgments

References

Bedore, L. M., Peña, E. D., Anaya, J. B, Nieto, R., Lugo-Neris, M. J., & Baron, A. (2018). Understanding disorder within variation: Production of English grammatical forms by English language learners. *Language, Speech, and Hearing Services in Schools, 49*(2), 277–291. https://doi.org/10.1044/2017_LSHSS-17-0027

Bedore, L. M., Peña, 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.

Caesar, L. G., & Kohler, P. D. (2007). The state of school-based bilingual assessment: Actual practice versus recommended guidelines. *Language, Speech, and Hearing Services in Schools, 38*(3), 190–200. https://doi.org/10.1044/0161-1461(2007/020)

Castilla-Earls, A., Francis, D., Iglesias, A., & Davidson, K. (2019). The impact of the Spanish-to-English proficiency shift on the grammaticality of English learners. *Journal of Speech, Language, and Hearing Research, 62*(6), 1739–1754. https://doi.org/10.1044/2018_JSLHR-L-18-0324

Đông, L. Q. (2012). Some relevant terms in the study of Vietnamese serial verb constructions. *VNU Journal of Science: Social Sciences and Humanities, 28*(5E), 40–46.

Ebert, K. D., & Pham, G. (2017). Synthesizing information from language samples and standardized tests in school-age bilingual assessment. *Language, Speech, and Hearing Services in Schools, 48*(1), 42–55. https://doi.org/10.1044/2016_LSHSS-16-0007

Ebert, K. D., & Scott, C. M. (2014). Relationships between narrative language samples and norm-referenced test scores in language assessments of school-age children. *Language, Speech, and Hearing Services in Schools, 45*(4), 337–350. https://doi.org/10.1044/2014_LSHSS-14-0034

Eisenberg, S. L., Guo, L.-Y., & Germezia, M. (2012). How grammatical are 3-year-olds? *Language, Speech, and Hearing Services in Schools, 43*(1), 36–52. https://doi.org/10.1044/0161-1461(2011/10-0093)

Fillmore, L. W. (1991). When learning a second language means losing the first. *Early Childhood Research Quarterly, 6*(3), 323–346.

Gagarina, N., Klop, D., Kunnari, S., Tantele, K., Välimaa, T., Balčiūnienė, I., Bohnacker, U., & Walters, J. (2012). *MAIN: Multilingual assessment instrument for narratives*. Zentrum für Allgemeine Sprachwissenschaft.

Gillam, R. B., & Johnston, J. R. (1992). Spoken and written language relationships in language/learning-impaired and normally achieving school-age children. *Journal of Speech and Hearing Research, 35*(6), 1303–1315. https://doi.org/10.1044/jshr.3506.1303

Goldstein, B. A. (2012). *Bilingual language development and disorders in Spanish–English speakers* (2nd ed.). Brookes.

Gutiérrez-Clellen, V. F., & Hofstetter, R. (1994). Syntactic complexity in Spanish narratives: A developmental study. *Journal of Speech and Hearing Research, 37*(3), 645–654. https://doi.org/10.1044/jshr.3703.645

Gutiérrez-Clellen, V. F., & Simon-Cereijido, G. (2007). The discriminant accuracy of a grammatical measure with Latino English-speaking children. *Journal of Speech, Language, and Hearing Research, 50*(4), 968–981. https://doi.org/10.1044/1092-4388(2007/068)

Gummersall, D. M., & Strong, C. J. (1999). Assessment of complex sentence production in a narrative context. *Language, Speech, and Hearing Services in Schools, 30*(2), 152–164. https://doi.org/10.1044/0161-1461.3002.152

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Guo, L.-Y., & Schneider, P. (2016). Differentiating school-aged children with and without language impairment using tense and grammaticality measures from a narrative task. *Journal of Speech, Language, and Hearing Research, 59*(2), 317–329. https://doi.org/10.1044/2015_JSLHR-L-15-0066

Hao, Y., Bedore, L. M., Sheng, L., & Peña, E. D. (2018). Narrative skills in two languages of Mandarin–English bilingual children. *International Journal of Speech-Language Pathology, 21*(4), 325–335.

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, 19*(2), 154–166. https://doi.org/10.1044/1058-0360(2009/08-0024)

Heilmann, J. J., Rojas, R., Iglesias, A., & Miller, J. F. (2016). Clinical impact of wordless picture storybooks on bilingual narrative language production: A comparison of the 'Frog' stories. *International Journal of Language & Communication Disorders, 51*(3), 339–345.

Kohnert, K. (2010). Bilingual children with primary language impairment: Issues, evidence and implications for clinical actions. *Journal of Communication Disorders, 43*(6), 456–473.

Kohnert, K. (2013). *Language disorders in bilingual children and adults.* Plural.

Langdon, H. W., & Saenz, T. I. (Eds.). (2015). *Working with interpreters and translators: A guide for speech-language pathologists and audiologists* (2nd ed.). Plural.

Leseman, P. P. (2000). Bilingual vocabulary development of Turkish preschoolers in the Netherlands. *Journal of Multilingual and Multicultural Development, 21*(2), 93–112.

Loban, W. (1976). *Language development: Kindergarten through grade twelve* (Research Report No. 18). National Council of Teachers of English.

Marchman, V. A., Wulfeck, B., & Ellis Weismer, S. (1999). Morphological productivity in children with normal language and SLI: A study of the English past tense. *Journal of Speech, Language, and Hearing Research, 42*(1), 206–219. https://doi.org/10.1044/jslhr.4201.206

Miller, J., & Iglesias, A. (2012). *Systematic Analysis of Language Transcripts (SALT)* (Research Version 2012) [Computer software]. SALT Software.

Muñoz, M. L., Gillam, R. B., Peña, E. D., & Gulley-Faehnle, A. (2003). Measures of language development in fictional narratives of Latino children. *Language, Speech, and Hearing Services in Schools, 34*(4), 332–342. https://doi.org/10.1044/0161-1461(2003/027)

National Resource Center for Asian Languages. (2019). *Vietnamese resources.* http://www.fullerton.edu/nrcal/resources/resources_vietnamese.php

Nguyen, D. H. (1957). Classifiers in Vietnamese. *Word, 13*(1), 124–152.

Nguyen, D. H. (1997). *Vietnamese: Tieng Viet Khong Son Phan* [Vietnamese without veneer]. John Benjamins.

Nguyen, D. H., Alves, M. J., & Nguyen, H. C. (2018). Vietnamese. In B. Comrie (Ed.), *The world's major languages* (pp. 714–730). Routledge.

Nguyen, H. T. (2013). The Vietnamese noun phrase. In D. Hole & E. Lobel (Eds.), *Linguistics of Vietnamese: An international survey* (pp. 57–87). DeGruyter Mouton.

Odlin, T. (1989). *Language transfer: Cross-linguistic influence in language learning.* Cambridge University Press.

Oetting, J. B. (2018). Prologue: Toward accurate identification of developmental language disorder within linguistically diverse schools. *Language, Speech, and Hearing Services in Schools,* 49(2), 213–217. https://doi.org/10.1044/2018_LSHSS-CLSLD-17-0156

Paradis, J. (2005). Grammatical morphology in children learning English as a second language: Implications of similarities with specific language impairment. *Language, Speech, and Hearing Services in Schools, 36*(3), 172–187. https://doi.org/10.1044/0161-1461(2005/019)

Paradis, J., & Blom, E. (2016). Do early successive bilinguals show the English L2 pattern of precocious BE acquisition? *Bilingualism: Language and Cognition, 19*(3), 630–635.

Paradis, J., Genesee, F., & Crago, M. B. (2011). *Dual language development & disorder.* Brookes.

Peña, E. D., Gutiérrez-Clellen, V. F., Iglesias, A., Goldstein, B., & Bedore, L. M. (2018). *Bilingual English Spanish Assessment* (BESA). Brookes.

Pham, G. (2015) *Working with an interpreter to analyze a language sample* [Handout]. https://slhs.sdsu.edu/bdc/files/2018/11/Pham-2015-Handout-Language-sample-questions-for-Interpreters.pdf

Pham, G. (2016). Pathways for learning two languages: Lexical and grammatical associations within and across languages in sequential bilingual children. *Bilingualism: Language and Cognition, 19*(5), 928–938.

Pham, G., Dam, Q., & Donovan, D. (2014). *Vocabulary skills in preschoolers learning Vietnamese & English.* Poster session presented at the Annual Conference of the American-Speech-Language-Hearing-Association, Orlando, FL, United States.

Pham, G., Donovan, D., Dam, Q., & Contant, A. (2018). Learning words and definitions in two languages: What promotes cross-language transfer? *Language Learning, 68*(1), 206–233.

Pham, G., & Kohnert, K. (2008). A corpus-based analysis of Vietnamese 'classifiers' con and cái. *Mon-Khmer. Studies, 38*, 161–171.

Pham, G., & Kohnert, K. (2014). A longitudinal study of lexical development in children learning Vietnamese and English. *Child Development, 85*(2), 767–782.

Pham, G. T., Pruitt-Lord, S., Snow, C. E., Nguyen, Y. H. T., Pham, B., Dao, T. B. T., Tran, N. B. T., Pham, L. T., Hoang, H. T., & Dam, Q. D. (2019). Identifying developmental language disorder in Vietnamese children. *Journal of Speech, Language, and Hearing Research, 62*(5), 1452–1467. https://pubs.asha.org/action/doSearch?AllField=Identifying+developmental+language+disorder+in+Vietnamese+children#

Pham, G., & Tipton, T. (2018). Internal and external factors that support children's minority first language and English. *Language, Speech, and Hearing Services in Schools, 49*(3), 595–606. https://doi.org/10.1044/2018_LSHSS-17-0086

Phan, T. (2013). The projection of inner aspect in Vietnamese. *Journal of Portuguese Linguistics, 12*(1), 41–62.

Potapova, I., Kelly, S., Combiths, P. N., & Pruitt-Lord, S. L. (2018). Evaluating English morpheme accuracy, diversity, and productivity measures in language samples of developing bilinguals. *Language, Speech, and Hearing Services in Schools, 49*(2), 260–276. https://doi.org/10.1044/2017_LSHSS-17-0026

Potapova, I., & Pruitt-Lord, S. L. (2019). Towards understanding the bilingual profile in typical and atypical language development: A tutorial. *International Journal of Speech-Language Pathology,* 1–11.

Seliger, H. W., & Vago, R. M. (Eds.). (1991). *First language attrition.* Cambridge University Press.

Simon-Cereijido, G., & Gutiérrez-Clellen, V. F. (2007). Spontaneous language markers of Spanish language impairment. *Applied Psycholinguistics, 28*(2), 317–339.

Simpson, A., & Tam, H. H. (2013). Vietnamese and the typology of passive constructions. In D. Hole & E. Lobel (Eds.),

23

Linguistics of Vietnamese: An international survey (pp. 155–185). DeGruyter Mouton.

Southwood, F., & Russell, A. F. (2004). Comparison of conversation, freeplay, and story generation as methods of language sample elicitation. *Journal of Speech, Language, and Hearing Research, 47*(2), 377–388. https://doi.org/10.1044/1092-4388(2004/030)

Tang, G. (2007). Cross-linguistic analysis of Vietnamese and English with implications for Vietnamese language acquisition and maintenance in the United States. *Journal of Southeast Asian American Education and Advancement, 2*(1), 3.

Tran, J. (2010). Child acquisition of Vietnamese classifier phrases. *Journal of the Southeast Asian Linguistics Society, 3,* 111–137.

Tran, J., & Deen, K. (2009). Aspect marking and modality in child Vietnamese. *Journal of the Southeast Asian Linguistics Society, 2,* 227–239.

U.S. Census Bureau. (2013). *Infographics & visualizations: Top languages other than English spoken in 1980 and changes in relative rank, 1990–2010.* https://www.census.gov/dataviz/visualizations/045/

Chapter 1, in full, is a reprint of material as it appears in Dam, Q., Pham, G., Potapova, I., & Pruitt-Lord, S. (2020). Grammatical characteristics of Vietnamese and English in developing bilingual children. *American Journal of Speech-Language Pathology*, *29*, 1212-1225. https://doi.org/10.1044/2019_AJSLP-19-00146. The dissertation author was the primary investigator and author of this paper.

CHAPTER 2

Remote first-language assessment: Feasibility study

with Vietnamese bilingual children and their caregivers

Abstract

Purpose: There is a shortage of bilingual speech-language pathologists (SLPs) in the US (< 8% across languages). For Vietnamese, less than 1% of SLPs speak the language compared to a Vietnamese American population of >2.1 million (Budiman, 2021). This study examines the feasibility and social validity of remote child language assessment with the help of a caregiver to address the need for first language assessments among Vietnamese-speaking children. **Method:** Twenty-one dyads of caregivers and children (aged 3-6) completed two assessment sessions in Vietnamese using Zoom videoconferencing. The two sessions were counterbalanced between two conditions in which either the clinician or the caregiver was the task administrator. Children's language samples were elicited using narrative tasks (Gagarina et al., 2019). Social validity was also assessed through caregiver and child questionnaires at the end of each session. **Results:** There were no significant differences between conditions on language sample measures nor the measures of social validity. Both caregivers and their children felt positively about the sessions. The caregivers' feelings were related to their perception of children's feelings about the sessions. Children's feelings were related to their Vietnamese language proficiency, caregiver-reported language ability, and whether they were born outside of the US. **Conclusions:** Findings from this work build the evidence base for telepractice as an effective and socially valid service delivery model for bilingual children in the US. This study also supports the potential for caregivers as task administrators in a telepractice setting, making assessment in a child's first language more feasible and accessible.

Remote first-language assessment:

Feasibility study with Vietnamese bilingual children and their caregivers

About 7-10% of children are at risk for developing a language disorder, and similar rates are predicted for bilinguals (NCBI, 2016). Early identification of language disorders can contribute to better treatment outcomes. For bilinguals in the initial stages of acquiring English as a second language (L2), assessing in children's first language (L1) is more reflective of their true language ability. Bilingual children are often misdiagnosed for a language disorder when tested only in English. Clinical assessment in children's L1 is vital for accurate and early identification of a language disorder, which will lead to timely intervention when needed and better long-term outcomes.

A large challenge to assessing children's L1 is the shortage of bilingual service providers. The majority of speech-language pathologists (SLPs) in the US are monolingual speakers of English. About 8% of SLPs are bilingual service providers (ASHA, 2021). Furthermore, bilingual SLPs are often not located in the same geographic area as the children in need of assessment. One solution is telepractice, approved by the American Speech-Language-Hearing Association to increase access to services for culturally and linguistically diverse populations (ASHA, n.d.). Studies, mainly with monolingual children, have shown success with the use of telepractice in intervention (Molini-Avejonas et al., 2015). More studies are needed on telepractice in *assessment*, particularly with bilingual children. The present study focuses on Vietnamese-speaking children to evaluate the feasibility of remotely assessing children's first language. Vietnamese is an understudied yet large U.S. population with over 2.1 million people (Budiman, 2021). However, according to ASHA, only 88 SLP members self-identified as

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multilingual service providers of Vietnamese (ASHA, 2021), highlighting the shortage of bilingual SLPs to provide services for Vietnamese speakers.

Telepractice

Telepractice is the application of telecommunications technology to deliver professional services at a distance. Telepractice enables SLPs to deliver services to individuals with communication disorders through an online platform. Some benefits of telepractice include reducing costs associated with in-person meetings (e.g., facility maintenance) and saving time due to traveling which can mean maximizing time spent with clients (Snodgrass et al., 2017). The ability to expand services means that telepractice can increase access to speech and language services for culturally and linguistically diverse populations, especially for those who do not live in the same geographic locations as bilingual SLPs.

In the area of child language *assessment*, most telepractice studies have focused on monolingual, English-speaking populations. Waite and colleagues (2010) used the Clinical Evaluations of Language Fundamentals-4th Edition (CELF-4) to assess the language of 25 children, aged 5 to 9 years, who had language difficulties. The children were either given the test by a clinician face-to-face or by a clinician online. They found that there was no significant difference between the total scores for each subtest within the CELF-4 in the online and face-to-face conditions. This study suggests that telepractice service delivery is as reliable as face-to-face delivery for a standardized assessment such as the CELF-4.

Since the start of the global COVID-19 pandemic, there has been more research related to telepractice assessment with children (Peña & Sutherland, 2022). Many researchers and SLPs transitioned to online assessment and intervention in response to the pandemic (ASHA, n.d.). In their Introduction to the *Language, Speech, and Hearing Services in Schools* (LSHSS) Forum:

Can You See My Screen? Virtual Assessment in Speech and Language, Peña and Sutherland (2022), introduced seven articles that investigated the validity and reliability of 14 different assessment tools. Overall, they concluded that it is possible to reliably assess children in a virtual environment. The measures used in the seven articles included both receptive and expressive measures, including narratives, conducted with monolingual and/or bilingual children as young as 3 years of age.

Of note, one study in the LSHSS 2022 forum looked at the feasibility of telepractice using three different tasks, including the Multilingual Assessment Instrument for Narratives-Revised (MAIN, Gagarina et al, 2019) with 4- to 6-year-old monolingual and Spanish-English bilingual children (Pratt et al., 2022). They compared the children's performances face-to-face versus telepractice service delivery. Results showed strong and positive relations between performance in both environments (e.g., the Spearman rank correlation for the MAIN comprehension task was $\rho[8] = .979, p < .01$). However, due to the physical distancing regulations during the pandemic, test administrators were mothers of the child participants, who were also SLPs. The test administrator did not vary between conditions (virtual vs. face-to-face), which served as experimental control for the within-subject comparisons; however, familiarity with the client might limit the generalizability for more typical clinical environments, where the test administrator is not related to the child.

Although telepractice can be beneficial in several ways, it comes with some notable challenges. Telepractice requires some level of technological skills to navigate online platforms and individuals differ in their familiarity with technology. For example, young children may need assistance from an adult to use the internet. However, familiarity with technology may be dependent on age as older adults use information technology less than younger adults

(Lepkowsky, 2020). Another challenge is that technology can be inconsistent. Poor internet connectivity or malfunctioning of the video conferencing software can cause delays as well as decreasing sound and visual quality (e.g., Nelson & Plante, 2022; Sutherland, 2017). Attention is one other challenge with remote service delivery. Individuals, especially children, may find it difficult to pay attention or concentrate on the tasks provided on the screen. It can be difficult for SLPs to control the environment as well as mitigate unwanted behaviors at a distance (e.g., Nelson & Plante, 2022; Sutherland, 2017).

Raman and colleagues (2019) recommended that a trained facilitator is needed to manipulate technology and mitigate child behavior for successful assessment via telepractice. Their study compared telepractice and face-to-face service delivery of a screening tool with 32 first graders, 15 of whom were identified as having language concerns by their teachers. The screenings in both conditions were conducted by trained SLPs; however, the telepractice condition involved the aid of a primary school teaching assistant to serve as a facilitator for the child. Results showed that there were no significant differences in language outcomes between both conditions. Authors reported technology-related factors and child-related factors that interfered with the screening in the telepractice condition. Challenges included stability of internet connection and the child's speech intelligibility and attention span. These challenges were better overcome with the assistance of a trained facilitator.

Involving Caregivers in Telepractice

Although a trained facilitator may play a crucial role in telepractice assessment (Raman et al., 2019), it is not always feasible especially if the assessment is conducted in the child's home. Another way to overcome some of the challenges for telepractice involving children is through the help of a caregiver. Although caregivers may not be professionally trained, they can

be successfully guided to help facilitate the telepractice session. The involvement of caregivers has always been crucial to speech and language services for children. Caregivers are children's frequent communicators and teachers. Most studies on child interventions via telepractice have involved parent or caregiver assistance.

Akemoglu and colleagues (2020) conducted a systematic literature review on telepractice and parent-implemented language and communication interventions. They included studies with young children, aged 0 to 8 years, with developmental disorders, whose parents received training and served as the interventionist, resulting in 12 studies for review. In these studies, at least one component of the intervention was delivered via telepractice, and the parents were trained either online or using a combination of both face-to-face and online delivery methods. Overall, these studies reported increases in parents' use of specific strategies including modeling, following the child's lead, and prompting. Improvements in child outcomes were also reported, including increased speech production, initiation and imitation skills. Of note, a total of 86 parents were involved across studies with only 37 parents reporting on their race/ethnicity, of which 32 were Caucasian. The involvement of caregivers from a range of racial and ethnic backgrounds, as well as bilingual caregivers, is vital to capture the linguistic and cultural diversity represented in our society. Moreover, all the child participants had Autism Spectrum Disorder. Further investigation on a broader range of disorders would contribute to our knowledge of telepractice efficacy.

Bilingual Assessment and Telepractice

There are only a few studies of child language assessment via telepractice with bilingual children. Half of the child participants in the assessment study by Pratt and colleagues (2022) were Spanish-English bilinguals. The children were exposed to Spanish from birth and were receiving at least 20% of their language input in Spanish during a typical week. Due to the

randomization procedures of the study, one bilingual child was randomly assigned to be assessed in Spanish and English, and the rest were randomly assigned to be tested in English only. However, all of these children performed consistently across in-person and telepractice conditions in the language(s) they were assigned to. Because this study only had one bilingual child tested in their L1, Spanish, conclusions about L1 testing cannot be generalized.

Castilla-Earls and colleagues (2022) investigated the effect of in-person versus telepractice delivery on both Spanish and English receptive vocabulary of 89 Spanish-English bilingual children (aged 3 to 8) with and without developmental language disorder at two time points of one year apart. At Time 1, all children were assessed in person, and at Time 2, a subset were assessed via telepractice. They concluded that the method of delivery was not a significant predictor of the scores in either language. However, details of the telepractice sessions did not specify whether the child had assistance in the home during the assessment; caregiver involvement and challenges were not discussed.

To the best of our knowledge, there is only one study directly examining telepractice assessment procedures with bilingual children using the assistance of a caregiver. Du and colleagues (2020) examined interference and support behaviors from parents to their child on an experimental child language screening task with 16 bilingual Mandarin-English speaking parent-child dyads. The MECO-LAB was a receptive language task where the child selected a correct picture response from an array of 2-4 picture choices after listening to an audio prompt. The task included both Mandarin and English modules. The parent was given written instructions on the task and was asked to explain the procedures to their child before accompanying the child as they completed the task on a computer touchscreen. There were a total of 677 observed parent behaviors, of which 381 were support behaviors and 296 were interference behaviors. Support

behaviors were related to verbal encouragement and technical support, whereas interference behaviors were related to repeating and analyzing the prompts.

Du et al., (2020) showed the feasibility of parents giving an online receptive language task to their children. Overall, 11 of 16 parents were able to adhere to assessment protocols (i.e., demonstrating less than ten incidents of interference). For the five parents who were not able to adhere to protocols, the authors noted that they did not thoroughly read the instructions and did not carefully explain the procedures to their children. This resulted in the parents repeating sentences and helping the child, which were prohibited. Du and colleagues (2020) relied on parents reading and understanding of written instructions in Mandarin and English to administer the language task. However, not every parent is a reader and may benefit from training or an orientation to introduce expectations and procedures.

Although Du and colleagues (2020) establish feasibility for involving caregivers in remote assessment, their study focuses on a receptive task that requires less interaction between the parent and child. More information is needed on telepractice assessment using expressive tasks, such as collecting a language sample.

Language Sample Analysis

Language sample analysis (LSA) is considered a gold standard in bilingual language assessment (Heilmann et al., 2016). LSA can be used with children of various ages and with different cultural and linguistic backgrounds (Gargarina et al., 2019). LSA can be applied to a variety of elicitation procedures including storytelling, story retelling, and personal narratives. There are also many ways to analyze a language sample, including analysis at the microstructural level (e.g., mean length of utterance) and at the macrostructural level (e.g., story elements).

There have been several studies of microstructural and macrostructural measures in bilingual children's narrative skills. Hao and colleagues (2019) examined both types of measures in the narrative skills of 21 bilingual Mandarin-English children, aged 4 to 9 years. The children completed tasks of story retell and story tell. Macrostructural measures included identification of seven story elements, and microstructural measures included grammar elements in English and in Mandarin as well as total number of communication units (C-units), total number of words, number of different words (NDW), and mean length of utterance (MLU). Results showed that children performed better in English than in Mandarin, and the difference is greater for microstructural measures than macrostructural measures. They also found that age was highly correlated with English macrostructural measures ($r = 0.64$) and microstructural measures ($r = 0.54$). In contrast, age did not correlate with the same measures in Mandarin. Findings indicated that children's English skills may be related to their increased cumulative English exposure and that their Mandarin skills may be plateauing (i.e., unrelated to increasing age) due to insufficient Mandarin exposure. Therefore, low performance in the children's first language does not always indicate a language disorder.

There are a few studies of narrative development in Vietnamese-English bilinguals, the target population of the present study. Microstructural measures have been examined in Vietnamese-English bilinguals' narrative skills. Pham (2016) examined longitudinal lexical-grammatical associations in Vietnamese (L1; first language) and English (L2; second language) of 33 six- to nine-year-old sequential bilingual children using picture naming tasks and storytelling over a four-year period. Microstructural measures of MLU and NDW were examined for the narrative tasks. Results showed bidirectional within-language associations for the lexical and grammatical domains, indicating robust relationships between vocabulary and grammatical

development within each language over time. In contrast, there was a single cross-language association with initial Vietnamese NDW predicting later English NDW. This study showed that increases in the L1 might contribute to increases in both the L1 and L2, whereas increases in the L2 did not contribute to increases in the L1. Of note, study participants attended a school program that provided Vietnamese language and literacy instruction for 90 minutes per day in addition to the English curriculum. Children who have less support in their L1 might show different patterns over time and relatively weaker narrative skills in their L1.

In a cross-sectional study, Dam and colleagues (2020) examined microstructural measures of Vietnamese-English bilingual children using narrative tasks. Children in this study had varying degrees of Vietnamese input, and most did not have Vietnamese instruction in school. This study used the Multilingual Assessment Instrument for Narratives (MAIN, Gagarina et al., 2019), to elicit Vietnamese and English languages samples from 89 typically developing bilingual children, aged 3-8 years. Language samples were analyzed for microstructural measures, including subordination index (SI, a measure of syntactic complexity), and grammaticality (GRAM, a measure of syntactic accuracy). For the Vietnamese language samples, age correlated with SI ($r = .376, p < .001$) but not GRAM ($p = .201$), indicating that older children had greater syntactic complexity than younger children (i.e., used more multiclausal sentences), but did not improve in accuracy with age. For the English language samples, age positively correlated with both SI ($r = .649, p < .001$) and GRAM ($r = .356, p = .001$), indicating increases in both syntactic complexity and accuracy in older children. Findings suggest that children are improving in their English grammatical skills, whereas their first language, Vietnamese, might be showing signs of stagnation at the grammatical level.

Studies reviewed in this section were conducted with typically developing bilingual children. In a Difference within Disorders framework (Oetting, 2018), these typical patterns provide a key reference point for understanding language disorders in bilingual populations. Children in the US who speak a home language other than English may show higher proficiency in their first language upon school entry (Garcia, 1986). First language assessment is critical for accurate identification, particularly in the early school years.

Social Validity

Telepractice is considered a socially valid service delivery model. Several studies examine social validity among SLPs (e.g., Tucker, 2012), with a subset of studies involving caregivers (e.g., Sutherland et al., 2017). Overall, both clinicians and caregivers share positive views on telepractice and they consider telepractice to be just as valuable as face-to-face services. However, social validity is highly dependent on the populations represented in the literature. Sutherland and colleagues (2017) examined the feasibility and reliability of conducting a standardized language assessment with school-aged children via telepractice. They also examined children's and parents' reaction to telepractice through a parent reported survey. The survey asked parents if their child felt comfortable and if they felt comfortable during the telepractice assessment. Participants were 23 children (aged 8-12 years) who had a history of reading difficulties and a known or suspected language impairment. Only 13 out of 23 parents answered the survey. Parents reported that they and their children felt "somewhat comfortable" or "definitely comfortable" about the assessment. Most parental comments showed positive and supportive feelings with only two expressing concerns about their child's level of concentration and lack of interest in using the computer and videoconferencing. The children in this study were

in the older age group compared to the current study, and no information was reported about their language and cultural background.

The literature on the social validity of telepractice among bilingual families is scarce. One such study by Fitton and colleagues (2017) examined factors that moderate Spanish-speaking caregivers' interest in telepractice. They examined survey responses from 79 Spanish-speaking caregivers who have children between the ages of 1 and 18 years. Caregivers were more interested in telepractice if their child needed services or if they wanted to increase access to Spanish language support. More information is needed to measure social validity in other bilingual groups.

To meet the needs of culturally and linguistically diverse clients, cultural considerations for telepractice are needed. There needs to be less biased selection of assessment tools that are appropriate for the technology being used. One way to undergo less biased assessment or intervention procedures is by adapting existing procedures to a certain culture and language. Cycyk and colleagues (2021) documented their adaptation of a language intervention for Spanish-speaking Mexican immigrant families using the Cultural Adaptation Process (CAP, Domenech Rodríguez & Weiling, 2011). They completed the three phases of the CAP including setting the stage (e.g. community collaboration), initial adaptation (e.g., piloting), and adaptation iterations (e.g., finalizing adaptation). This rigorous process ensures that the families' language as well as their culture are considered for appropriate treatment of children's language difficulties.

The present study

Under a general CAP framework, the present study examines the involvement of caregivers in a child language assessment via telepractice for bilingual Vietnamese-English

children. We compared two conditions that varied by the extent of caregiver involvement: a condition where the caregiver directly implemented the language tasks (i.e., caregiver-directed) and a condition where the clinician directly implemented the language tasks with indirect support from the caregiver (i.e., clinician-directed). We asked the following research questions:

1. Did children perform better in one condition than the other (caregiver- vs. clinician-directed) based on the language sample measures?

2. Did children feel more positively about one condition than the other? What factors influenced their feelings?

3. Did caregivers feel more positively about one condition than the other in regards to their children's experience and their own experience? What factors influenced their feelings?

Predictions for this study are limited by the dearth of research on tele-assessment and bilingual children. On one hand, remote child language assessment can be challenging in that the clinician does not have direct contact with the child. Physical distance between the clinician and the child may lead to a lack of trust, rapport, or the ability for the child to maintain attention (Sutherland, 2017). Because of these challenges, the caregiver-directed condition might be more advantageous. Given detailed instructions, caregivers may be a potential group of task administrators in a telepractice setting (Du et al., 2020). On the other hand, caregivers do not have graduate-level training in speech-language pathology and may not be equipped to elicit language samples. Thus, the clinician-directed condition has the advantage of having a formally trained administrator eliciting language samples. In terms of social validity, participants may show positive feelings towards telepractice due to the accessibility for first language support (Fitton et al., 2017).

Methods

Participants

Participant recruitment included Vietnamese-English-speaking children and their caregivers living in the United States. Participants were recruited locally from preschools and elementary schools within the San Diego area as well as nationally through email and social media outlets. Bilingual flyers were distributed that contained information on the study and a web link to express interest. Interested families were contacted via phone or email in Vietnamese and/or English to complete the informed consent process and schedule study sessions.

Participants included 21 Vietnamese-speaking child-caregiver dyads living in the Southwest region (n=10), Northeast region (n=10), and Southcentral region (n=1) of the US. Caregivers completed a pre-assessment questionnaire to obtain demographic information, information on the children's language abilities, and language use and exposure (see Table 2.1) and caregiver's language abilities and level of comfort in using technology (see Table 2.2).

Children

Children (16 female; 5 male) were 3.25 - 6.83 years old (*M* = 5.31, SD = 1.08). They were typically developing with no parental concerns about their language abilities and no history of special education services. Children were excluded if they spoke more than two languages (beyond Vietnamese and English) and had a history of speech or language disorder. Eighteen of the children were born in the US and the remaining 3 children have been in the US for three years. Caregivers completed the Bilingual Input Output Survey (Peña et al., 2018) that was translated and adapted to Vietnamese (cf., Pham & Tipton, 2018) to report their child's history of language exposure and current levels of Vietnamese and English input and output. All children were exposed to Vietnamese since birth. The mean age of first English exposure was 2.59 years

(SD = 1.66). Average current levels of Vietnamese were 45.73% input (SD = 28.33, range = 11.49 – 100.00) and 46.72% output (SD = 31.66, range = 11.49 – 100.00). Average current levels of English were 54.27% input (SD = 28.33, range = 0.00 – 88.51) and 53.28% output (SD = 31.66, range = 0.00 – 88.51). It is noted that even though on average, input and output were relatively equal across languages, there was a wide range of exposure, which is a common characteristics of bilingual children in the US (Pham & Tipton, 2018).

Caregivers also completed the Instrument to Assess Language Knowledge (ITALK, Peña et al., 2018), translated and adapted to Vietnamese (cf., Pham et al., 2019), to determine their child's current Vietnamese and English abilities in five language domains: vocabulary, speech, sentence production, grammar, and comprehension. Caregivers rated children's current abilities in these domains on a five-point scale with 5 associated with highest ability. ITALK scores were averaged across all five domains for each language. The higher score between the two languages was then compared to a cutoff score of 4.18 (based on Spanish-English bilingual children; Peña et al., 2018). Any scores below the cutoff indicated a risk of a language disorder. Average score of the higher language was 4.31 (SD = 0.51). Thirteen of 21 children were rated above the cutoff score of 4.18 in their highest language. Nonetheless, all participants, including the eight children rated below the cutoff score, had no parent concerns for language learning or history of speech-language disorders.

Caregivers

Caregivers included mothers (n= 16), fathers (n= 4), and one aunt. Caregivers' mean age was 35.71 years (SD = 4.45). All but one caregiver were foreign born with the length of US stay ranging from 3 years to 38 years (*M* = 15.95, SD = 10.39). Highest level of education among caregivers ranged from high school to doctoral studies with most (71%) having a college

education or higher. We asked caregivers to rate their Vietnamese and English abilities based on the average across four domains (speaking, understanding, reading, and writing on the scale of 1 (not very well) to 6 (very well). On average, caregivers rated themselves as 5.70 (SD = 0.61) for Vietnamese abilities and 3.81 (SD = 1.95) for English. We also gave caregivers the Functional Assessment of Currently Employed Technology Scale (FACETS; Lepkowsky, 2018) in order to better understand their comfort levels in technology in five domains: home, social, e-commerce, health care, and technical. The FACETS was translated into Vietnamese by the first author and reviewed and edited by another native speaker of Vietnamese. FACETS scores can range from 0 (very infrequent Information Technology (IT) use) to 50 (very frequent IT use). On average, caregivers' indicated moderate use of technology (*M* = 32.90, SD = 12.48, range = 10 - 50).

General Procedures

A bilingual Vietnamese-English SLP (i.e., the clinician; first author) contacted families who signed up for the study via email and/or phone. The clinician conducted the informed consent process and had the caregiver sign the consent form via a Qualtrics link. The clinician scheduled two Zoom videoconferencing sessions with the caregiver and the child. The caregiver was sent a pre-session questionnaire to complete before the first session. The child and their caregiver completed the two study sessions with the clinician via Zoom. A brief picture-based questionnaire was given to the child at the end of each session. The caregiver also completed two post-session questionnaires, one after each session, on their own time (see Figure 2.1). All sessions were conducted in Vietnamese. The sessions were conducted at least one week apart from each other.

To ensure that the assessment sessions were culturally appropriate, we followed general procedures based on the Cultural Adaptation Process Model (CAP; Domenech Rodriguez &

Weiling, 2011) to adapt the session protocol for Vietnamese American families. Following the CAP Model, we created the protocol by collaborating with experts, e.g., bilingual Vietnamese-English SLPs, reviewing the literature on adapted procedures for culturally and linguistically diverse populations, and adapting the task to our target population. We piloted this initial protocol on two Vietnamese American families. After each pilot, we reviewed the protocol and made necessary revisions (Ramirez et al., 2022).

Adaptations to the protocol included translating the tasks and task instructions to Vietnamese if not already available. Our protocol was highly scripted and structured in order to maintain uniformity across administrators and lessen the administrative burden for caregivers. We also decided to minimize literacy demands within our protocol to create inclusive procedures for caregivers with a range of Vietnamese literacy skills. Instead of having caregivers read instructions, we provided caregivers with verbal instructions. Within the study tasks, we pre-recorded all instructions as well as presented the written instructions in Vietnamese, so that caregivers can rely on either their listening or reading skills to present instructions to their child. We considered that in Southeast Asian cultures, including Vietnamese, praising your children may not be a common practice (Trần & Bahr, 2015). We have included visual reward systems throughout the session, to give caregivers a chance to praise and encourage their children as well as to keep children engaged in the session. Because we were testing young children, we also considered collecting language samples through free play; however, in many Asian cultures caregivers may not directly facilitate play with their children at home (Parmar & Super, 2004). We decided not to include play, as it might be unnatural for Vietnamese families as well as unnatural in a telepractice setting.

Study sessions:

Child-Caregiver dyads participated in two 30- to 45-minute study sessions. Each study session differed by implementation conditions: clinician-directed condition and caregiver-directed condition. All sessions were video recorded via Zoom and audio recorded with a digital audio recorder placed next to the clinician's computer as a backup. We counterbalanced the implementation conditions: half of the participants completed the caregiver implementation first and the other half completed the clinician implementation first. We also counterbalanced the language sample tasks (two retell tasks and two tell tasks) between the two sessions, i.e., all the different combinations of the tasks were used for both sessions among the participant sample.

Clinician-Directed: In this condition, the clinician videoconferenced with the child and their caregiver and administered the assessment tasks to the child remotely. The caregiver's role was to observe and help navigate the Zoom and computer functionality for the child. The caregiver was instructed not to intervene with the child's responses during the assessment.

Caregiver-Directed: In this condition, the caregiver was provided a brief orientation (described in the next section) in Vietnamese by the clinician on how to administer the assessment tasks to their child. After the orientation, the child was asked to join the session and complete the assessment with their caregiver. The clinician quietly observed the session and controlled the testing flow and platform. The caregiver was allowed to communicate directly with the clinician if they needed any further assistance.

Caregiver Orientation: The orientation was 15 minutes in length and included details about the tasks, the order of the tasks, administration instructions, and tips on how to prompt for responses, and a brief practice session with the clinician. The orientation protocol was created based on caregiver training procedures outlined in the *framework for transitioning to telepractice*

by Snodgrass and colleagues (2017). Based on this framework, we identified targeted skills and strategies, created parent-friendly procedures, and provided instructions live through videoconferencing. We also included recommendations on caregiver instructions from Du and colleagues (2020), such as providing caregivers with examples of acceptable responses and prompts.

Social Validity

Child Questionnaires (see Table 2.3): After each study session, the clinician asked the child four questions about their experience in either Vietnamese or English depending on the child's preference. The questions were worded in simple terms to increase comprehension. The child was given a picture scale of 1 to 4, where 4 corresponded to very happy. This picture scale was from the Elementary Reading Attitude Survey (McKenna & Kear, 1990) and adapted to Vietnamese (Ho et al., 2022). They were asked about how they felt about (a) the session, (b) the tasks, (c) speaking in Vietnamese, and (d) sitting still to complete their work. Questions were created by the first author for the purpose of this study. The child had the option of answering verbally or pointing to one of the picture choices.

Caregiver Questionnaires (see Table 2.4): After each study session, the caregiver was sent a post-session questionnaire via a Qualtrics link to complete on their own time. The questionnaire was written in both Vietnamese and English. The caregivers were asked to rate their agreement level on eight statements about the session on a 5-point Likert scale: 1 (strongly disagree) to 5 (strongly disagree). The post-session questionnaire at the end of the second (last) session also included two additional open-ended questions that asked which session they felt more comfortable completing and which session they preferred for their child. Questions were developed by the first author specifically for this study. However, the question format and some

wording were based on questionnaires created for a survey study on parents' and students'

perceptions of telepractice services during the COVID-19 Pandemic by Lam and colleagues

(2021).

Language Sampling

For each session, Vietnamese language samples were collected from two storytelling

tasks, including one story retell task and one story tell task. All tasks were displayed through

PowerPoint slides via Zoom videoconferencing. We used the Multilingual Assessment

Instrument for Narratives (MAIN, Gagarina et al., 2019) to elicit the story retell and the story

tell. For the story retell task, we alternated between the *Cat* story and the *Dog* story. In this task,

the child saw a six-picture sequence story, heard a pre-recorded version of the story, and was

asked to tell the story in their own words. For the story tell task, we alternated between the *Baby*

Bird and the *Baby Goat* story. In this task, the child saw a six-picture sequence story and was

asked to tell the best story that they could. After each story task, the child answered ten story

comprehension questions as outlined in the MAIN manual.

Language Sampling Study Measures

The language samples were audio recorded and later transcribed and analyzed using

SALT software (Miller & Iglesias, 2012). For all transcripts, utterances were divided into

modified communication units (C-units), which are recommended for analyzing samples from

bilingual children (Miller & Iglesias, 2012). Given that Vietnamese is a pro-drop language,

modified C-units were used to account for the normal occurrence of subject deletion (Heilmann

et al., 2016).

The samples in each condition were combined to create a larger more representative

sample of the child's language (i.e., the retell and tell tasks in each condition were combined and

analyzed together). The combined language transcripts were analyzed for microstructural measures including mean length of utterance (MLU), number of different words (NDW), and total number of C-units. All microstructural measures were automatically generated from SALT software.

- Mean length of utterances (MLU) was calculated as the number of morphemes over the total number of modified C-units. For Vietnamese, each syllable was considered a morpheme (Thompson, 1963).

- Number of different words (NDW) was calculated as the total number of unique words in the language sample. For Vietnamese, what constitutes a word versus a syllable/morpheme continues to be debated (Thompson, 1963). Thus, NDW in Vietnamese was based on syllables, a unit of language that has wide agreement (cf., Pham et al., 2019).

- Total number of C-units was calculated as the total number of modified C-units in the language sample.

Each story (retell or tell) was individually analyzed for macrostructural measures of production and comprehension. Story production and story comprehension were scored based on scoring criteria outlined in the MAIN manual (Gagarina et al., 2019).

- For production, the child was scored on 17 story elements related to story structure, structural complexity, and internal state terms. For each item, the child received one point if the element was present in their story (maximum of 17 points per story). The points were then converted to a percentage (i.e., points scored divided by 17, multiplied by 100).

- For comprehension, the child was asked 10 questions and received one point for each

    question that was answered correctly (maximum of 10 points per story). The points were

    then converted to a percentage (i.e., points scored divided by 10, multiplied by100).

The scores were then averaged to create one production score and one comprehension score for

each condition. For example, a child's story production score for a clinician-directed condition

was the average of the story production scores from the story retell and story tell within this

condition. Similarly, the comprehension score for a clinician-directed condition is the average of

the comprehension scores from the story retell and story tell within this condition.

   For the story comprehension scores, we noticed that most of the children were not able to

comprehend the internal state questions (e.g. how did the boy feel?) mainly because the child did

not understand the word *cảm thấy* [feel] in Vietnamese. Not understanding this word impacted

three internal state questions that were followed up with why questions (e.g., why did the boy

feel [child's response]?), for a total of 6 questions (out of 10). Thus, we created a new

comprehension score that excluded all the internal state questions and the follow-up why

questions. The new comprehension score was then out of four points. The points were then

converted to a percentage (i.e., points scored divided by four, then multiplied by 100).

Language proficiency measures

   In addition to caregiver report of children's language proficiencies, we included direct

measures of Vietnamese and English, separate from the experimental tasks. At the end of each

session, the clinician administered one additional language sample task as a measure of the

children's language proficiency in Vietnamese (session 1) and English (session 2). The clinician-

administered story retell tasks in English and Vietnamese of two different wordless picture books

(Mayer, 1967 & Mayer & Mayer, 1975). In this task, the child listened to a pre-recorded version

of the story while looking at respective pages in the storybook. The child was then asked to retell the story page by page. Their language samples were audio recorded, transcribed, and analyzed for microstructural measures MLU, NDW, and total number of C-units (see Table 2.1).

Reliability

Transcription Reliability: The first author, who is an SLP fluent in Vietnamese, transcribed the stories using SALT conventions (e.g., excluding mazes and unintelligible words and phrases) and divided the utterances into modified C-units. A trained research assistant then relistened to all samples to check for transcription accuracy (for review of reliability procedures, see Ebert & Pham, 2017). Inter-rater reliability was calculated for the division of the modified C-units. The trained research assistant completed this task for 23% of the samples (20 stories for the MAIN stories), 24% of the samples (5 stories) for the wordless picture book stories for Vietnamese, and 24% of the samples (5 stories) for the wordless picture book stories for English. Reliability was calculated as the number of C-units similarly parsed divided by the total number of C-units parsed by the first author. A reliability score of 94.65% was achieved for division of the modified C-units for the MAIN stories, and 98.52% was achieved for the wordless picture book stories for Vietnamese and 95.18% for English.

Production Scoring Reliability: The first author scored the story production based on the story transcripts and audio recording. A trained research assistant then scored 23% of the samples (20 stories). Reliability was calculated as the number of elements similarly scored over the total number of elements being scored. A reliability score of 90.59% was achieved for production scoring.

Comprehension Scoring Reliability: The first author scored the story comprehension based on the audio recordings. A trained research assistant then scored 23% of the samples (20

stories). Reliability was calculated as the number of questions similarly scored over the total

number of questions being scored. A reliability score of 90.53% was achieved for

comprehension scoring.

Data Analyses

The language samples were analyzed for microstructural language measures of MLU,

NDW, and total number of C-units; and macrostructural language measures of story production,

story comprehension (out of 10) and story comprehension without internal state questions (out of

4). For the post-assessment questionnaires, individual items as well as composite scores were

analyzed. We created boxplots for all variables to inspect for outliers. We concluded that their

values did not reveal them to be extreme, and they were kept in the analysis. Assumptions of

normality were adequately met upon visual inspection of the Normal Q-Q plots.

To address the first research question, we conducted a one-way repeated measures

MANOVA that included all the dependent variables with one within-subjects factor

(implementation condition) to test whether there was a significant difference between the

caregiver-directed versus the clinician-directed conditions on the language measures.

For the second and third research questions, post-assessment questionnaires were

analyzed for the mean and standard deviation of responses to determine child and caregiver's

feelings and opinions about the telepractice experience. Paired-samples t-tests were used to

determine whether there was a statistically significant mean difference on child and caregiver

responses between the two conditions. Lastly, bivariate correlations were conducted to examine

whether the children and caregivers' feelings about the telepractice experience were related to

any child or caregiver measures.

Results

This study compared the effects of two assessment conditions: caregiver-directed and clinician-directed. The goal of the study was to better understand how much involvement is needed from caregivers in order to elicit language samples from young children via telepractice. We also sought to better understand the participants' feelings about the telepractice experience.

Effects of Implementation Conditions

1. Did children perform better on the language sample measures in one condition than the other (caregiver vs. clinician directed)?

    A one-way repeated measures MANOVA with one within-subjects factor (implementation condition) was conducted to test whether there was a significant difference between the conditions among the language measures. The omnibus test showed that there were no significant differences among the language sample measures between implementation conditions, Wilk's Lamba $= .548$,F $(6,14) = 1.922$; $p = .147$. See Table 2.5 for group mean and standard deviations of each language measures in each condition and averaged across conditions.

Social Validity

2. Did children feel more positively about the one condition than the other? What factors influenced their feelings?

    Children responded to four social validity questions about their feelings towards the session on the scale of 1 to 4, where 4 corresponds to very happy. We calculated the mean and standard deviation of the children's responses to each question as well as a composite score (average of all four questions, Cronbach's alpha $= 0.649$) for each condition as well as the average of the two conditions (see Table 2.3). Paired samples t-tests showed that there were no significant differences between the responses for the two conditions. On average, children felt

positively ($M = 2.74$, SD $= 0.52$) about the sessions. In terms of individual question items, on average, the children's feelings leaned towards being happy after completing the sessions ($M = 3.05$, SD $= 0.56$), speaking Vietnamese during the sessions ($M = 2.73$, SD $= 0.79$), and about the story tasks they completed ($M = 2.75$, SD $= 0.80$). On average, the children's feelings leaned towards being unhappy for having to sit still to complete the sessions ($M = 2.45$, SD $= 0.72$).

Bivariate correlations were conducted to see whether the children's survey composite scores were related to any child or parent measures (see Table 2.6). Results showed that the children's survey composite scores were related to the caregiver's report of the children's experience for both sessions ($r = .585$, $p = .007$) , whether the child was born in the US ($r = -.453$, $p = .045$), their higher ITALK score, which was a parent reported measure of their language ability ($r = .503$, $p = .024$), and two measures of Vietnamese proficiency: NDW ($r = .670$, $p = .002$) and total number of c-units ($r = .469$, $p = .043$).

3.   Did the caregivers feel more positively about one condition than the other in regards to their children's experience and their own experience? What factors influenced their feelings?

We asked caregivers to rate their level of agreement from the scale of 1 (disagree strongly) to 5 (agree strongly) on topics related to their child's experience and their own experience (see Table 2.4). We created three composite scores based on the questions: overall composite score (all questions, Cronbach's alpha $= 0.843$), child's experience (questions #1-4, Cronbach's alpha $= 0.788$), and caregiver's experience (questions #5-8, Cronbach's alpha $= 0.754$). We calculated the mean and standard deviation of their responses to each question and the composite scores for each condition and the average of both conditions (see Table 2.4). Paired sample t-tests for each question showed that there were no significant differences between

the responses and composite scores for the two conditions. On average, the caregivers felt positively about the sessions for their children ($M = 3.68$, $SD = 0.59$) and for themselves ($M = 4.11$, $SD = 0.44$). In terms of individual question items, on average, the caregivers leaned towards agreement that their child had a positive experience ($M = 4.43$, SD = 0.71) and that they were attentive during the sessions ($M = 4.07$, SD = 0.80). On average, the caregivers leaned toward neutrality that the tasks were difficult for their child ($M = 2.71$, SD = 0.64) or that their child spoke less than usual during the sessions ($M = 3.07$, SD = 1.02). On average, the caregivers also leaned towards agreement that they had a positive experience during the sessions ($M = 4.40$, SD = 0.56) and that they felt comfortable using technology with their children ($M = 4.52$, SD = 0.49). On average, the caregivers leaned towards disagreement that the session length was too long ($M = 2.43$, SD = 0.62) and that there were technical difficulties that interfered with the session ($M = 2.05$, SD = 0.80).

We also asked the participants to choose which session they felt more comfortable in and which session they preferred, i.e. their session 1 or session 2. Because the sessions were counterbalanced, we matched their responses to the appropriate conditions. Of the 20 responses (1 caregiver did not respond), half (n=10) of the caregivers felt more comfortable in the caregiver-directed condition and the other half (n=10) felt more comfortable in the clinician-directed condition. As for their preference, 12 caregivers preferred the caregiver-directed condition, and 8 caregivers preferred the clinician-directed condition. We also asked them for the reason for their choices, which will be discussed in the Discussion session.

We conducted bivariate correlations to examine whether caregivers' level of satisfaction about the telepractice experience was related to any child or caregiver measures (see Table 2.6). Results showed that the caregiver's report of their *child's* experience was related to the child's

reported experience ($r = .585$, $p = .007$), their own experience ($r = .547$, $p = .010$), and two measures of their child's Vietnamese proficiency: NDW ($r = .544$, $p = .013$) and total number of C-units ($r = .493$, $p = .027$). The caregiver's report of their *own* experience was only related to their report of their child's experience ($r = .547$, $p = .010$).

Discussion

Bilingual children in the initial stages of acquiring English may show higher performance in their first language (L1). Thus, clinical assessment in children's L1 is vital for accurate and early identification of a language disorder. In light of the shortage of bilingual service providers for the growing bilingual populations in the U.S, the present study proposed telepractice as one potential solution by examining the feasibility and social validity of remote child language assessment for Vietnamese American families. We analyzed language sample measures from 21 bilingual children (aged 3-6 years) between two conditions, which compared direct and indirect caregiver involvement: caregiver-directed and clinician-directed, respectively. We also asked caregivers and their children questions related to their feelings and opinions about each session.

Feasibility of Telepractice Involving Caregivers

Telepractice is one method of delivery that can potentially connect the niche of bilingual clinicians to families in need of bilingual evaluations. However, the imbalance between the two is still far too great (e.g., 88 Vietnamese bilingual SLP providers (ASHA, 2021) to 2.1 million Vietnamese people in the US). This study showed that we could potentially utilize the assistance of a caregiver to directly elicit language samples in the L1.

There were no significant differences between the children's performances (for both microstructural and macrostructural language sample measures) across study conditions. In the caregiver-directed condition, the caregiver was given a brief 15-minute orientation on how to

administer the story tasks to their child, and then they administered tasks to their child with the clinician observing via videoconferencing. In the clinician-directed condition, the caregiver sat next to their child and observed while the clinician administered the story tasks to the child via videoconferencing. Results from this study showed that caregivers could be given either an indirect role or a more direct role in their child's language assessment. Their level of involvement does not change their child's language sample outcomes. This also meant that caregivers can be a potential group of task administrators when given a more direct role in language assessment.

The feasibility of child language assessment via telepractice involving caregivers might be due to our highly structured and culturally adapted assessment protocol. In a telepractice setting, caregivers have the advantage of being in close proximity to the child and having an established rapport with the child. However, caregivers are not trained SLPs with the knowledge and experience in conducting a language assessment. To ensure that caregivers could successfully administer the language sample tasks, we created a highly structured assessment protocol that included relevant cultural adaptations following the CAP Model. Our goal was not to train caregivers to master language sample administration, but to be able to successfully adhere to the testing procedures right after being given an orientation on the process. Although the orientation was brief (e.g., 15 minutes), assessment procedures were purposefully minimal and included detailed instructions, visual demonstrations, and practice. We also reduced the administrative burden on the caregivers by pre-recording the assessment instructions and story retell tasks. Although caregivers were moderately frequent IT users (see Table 2.2), we also minimized the burden on technical instructions. The caregivers only had to ensure that the child could clearly see and hear the task presented, while the clinician controlled the Zoom

functionality and the flow of the task. These procedures were created in conjunction with cultural considerations and adaptations under the CAP Model. Together, they may have contributed to caregivers' success in adhering to testing procedures.

Caregivers as Task Administrators

Caregivers as a potential group of task administrators can be beneficial not only to bilingual children themselves but also to SLPs. Although telepractice can reduce the amount of travel time and potentially open up more room for scheduling clients, the number of bilingual clinicians are scarce and even fewer speak the same first language as the family in need of bilingual evaluations. However, time spent on each evaluation can be reduced with the help of a caregiver as a potential task administrator. For example, a Vietnamese-English bilingual SLP can give multiple caregivers a brief orientation on how to elicit storytelling language samples in the L1 from their children using online materials. The caregivers can then administer the language sample tasks online to their children and record the session. They can then send the recordings to the clinician to analyze. This method will help reduce the amount of time the clinician spends on administering the language sample tasks and could potentially assess more bilingual children.

Caregivers as a potential group of task administrators also opens up the door for bilingual providers of different backgrounds and trained monolingual providers to effectively assess children in both languages. For example, a monolingual English-speaking SLP can connect with a bilingual family to collect bilingual language samples from the child with the help of the caregiver. The SLP can administer the language sample tasks in English and the caregiver can administer the language sample tasks in the L1. The caregiver can be given a brief orientation about the language tasks by the SLP with an interpreter and/or an orientation in the L1 could be pre-recorded. Once the language sample tasks have been collected in both languages, the SLP

can analyze the English tasks and utilize different resources to analyze the L1 tasks (Pham, 2015).

Although involving caregivers in language assessment as tasks administrators could be beneficial, it is noted that a highly structured and culturally adapted protocol is recommended for the successful implementation. We recommend that the protocol minimizes administrative as well as technological procedures for the caregivers. It is also recommended that the caregivers are given detailed instructions and visual demonstrations. Pre-recording any parts of the assessment that could be pre-recorded is also recommended. However, it is noted that the protocol should be dependent upon the target population for language and cultural adaptation. Different cultures as well as individual families may differ in terms of how they receive information and how they perceive testing and telepractice. These differences should also be considered when directly involving caregivers in the assessment process.

Social Validity

Overall, both caregivers and their children felt positively about the telepractice sessions. There were some factors that might have influenced children and their caregivers' positive feelings about the telepractice sessions. Child characteristics associated with more positive feelings included those who had higher Vietnamese proficiency, higher reported language abilities, and being foreign born. Since the sessions were conducted in the child's first language, Vietnamese, it makes sense that the children who have more Vietnamese language skills and those who were foreign-born might have a more positive experience.

Caregivers' experience was related to their perception of their children's experience and not necessarily the children's self-reported feelings about the session. This meant that caregivers enjoyed the sessions if they felt that their children were also enjoying the session. Caregivers'

experience was also not related to any other relevant factor, such as their report of children's

Vietnamese abilities (i.e., Vietnamese ITALK scores) or their level of comfort in using

technology (i.e., FACETS scores). For example, children with lower Vietnamese language

abilities might show poor performance on their storytelling skills, but if caregivers perceived that

children enjoyed the session, then caregivers also reported enjoying the session. Since the

telepractice sessions required the use of technology, caregivers' comfort in using technology

might play a factor in their perception of the sessions. However, the lack of association might be

due to the fact that our pool of caregivers were moderate IT users or the fact that there were

minimal technological requirements and technical difficulties within sessions.

Regardless of the condition, the caregivers' reasoning for choosing one session over the

other was also mostly due to their perception of their child's comfort level and performance.

When asked to choose which session they felt more comfortable in, there was a tie between the

two conditions. Their reasoning was less related to their involvement in the assessment process.

Only two caregivers commented on their involvement: one caregiver who chose the caregiver-

directed condition wrote, "I got to communicate with my child during session 2." Half of the

participants noted that they felt more comfortable because it was the second session: one

caregiver wrote, "It was easier the second time around because we already understood the

directions." Other caregivers either did not have a reason or commented on their child's

performance or attitudes: One caregiver wrote, "Tại vì buổi 1 con mình háo hức hơn" [*English

translation: Because in the first session, my child was more excited*].

As for their preference, 12 caregivers preferred the caregiver-directed condition and 8

caregivers preferred the clinician-directed condition. Only two caregivers gave reasoning that

related to the session condition: One caregiver who chose the clinician-directed condition wrote

"I think my daughter got nervous when I'm there interacting with her." Three caregivers said they had no real preferences: one caregiver wrote "Each session was a different experience." Other caregivers either did not have a reason or chose the session that they felt their child should redo: one caregiver who chose the second session wrote, "Vì tôi cảm thấy con tôi chưa hoàn thành tốt bài 2" [*English translation: Because I felt that my child did not complete session 2 well*]. Overall, these written comments confirmed that the caregivers did not have a clear preference for one condition over the other and that their perspective of the sessions was based on their perspective of their children's experiences.

Study Limitations and Future Directions

There are limitations to this study. First, our sample consisted of 21 children. A larger sample size would increase the generalizability to the target population of Vietnamese American preschool and early school-age children. When comparing the two conditions, some of the variables were approaching significance with moderate effect sizes. A larger sample size might help determine the direction and magnitude of those variables.

Second, participants in the study were all typically developing children. Children with a language disorder may perform differently in each condition. For example, children with a language disorder might rely on familiarity and thus perform better in the caregiver-directed condition. Alternatively, children with a language disorder might benefit from careful systematic scaffolding that a graduate-level clinician could provide. Future studies that include children with language disorders can compare their performance across conditions to see whether there is an effect for language ability status.

Third, our study tasks were limited to the MAIN stories. There are multiple ways to elicit a language sample. We decided to use the MAIN stories due to their availability in Vietnamese

and that it has been used in other studies to elicit language samples from Vietnamese-speaking children (e.g., Pham et al., 2019). Another reason for choosing the MAIN stories or story picture retells and tells in general, is that they are relatively easy to administer. We have developed highly structured procedures to lessen the administrative burden for caregivers. For example, all verbal instructions were pre-recorded, and caregivers were asked to listen and repeat the instructions to their child. However, eliciting language samples through storytelling may not work for every child. Future studies can include different ways of language sample elicitation, such as story narratives or free play. We did not include these elicitation methods in this study because we wanted to keep the caregiver orientation simple and brief. Story narratives or free play elicitation methods may require the caregivers to have more training on a variety of prompting strategies and may feel unnatural in a videoconferencing session. Future studies can also include other types of assessment tasks. Finally, language sampling is only one part of a comprehensive evaluation. Adding receptive tasks might be beneficial for those children who show weakness in this language domain.

Conclusion

Findings from this study build the evidence base for telepractice as an effective and socially valid service delivery model for first language evaluation for bilingual children, particularly for Vietnamese Americans. Telepractice has the potential to increase clients' access to SLPs services and improve language assessment for bilingual children. Findings from this study refined procedures to involve bilingual caregivers as a potential group of task administrators. Involving caregivers in tele-assessment can help to increase feasibility of assessing children's first language, especially when the SLP does not speak this language and/or when a bilingual SLP is not locally available. Careful consideration on how to involve caregivers

includes translation of materials, orientation in the caregiver's preferred language, and methods

of relieving some of the burden for task administration (e.g., pre-recorded stimuli and highly

structured activities).

References

Akemoglu, Y., Muharib, R., & Meadan, H. (2020). A systematic and quality review of parent-implemented language and communication interventions conducted via telepractice. *Journal of Behavioral Education, 29*, 282-316. https://doi.org/10.1007/s10864-019-09356-3

American Speech-Language-Hearing Association (n.d.). *Telepractice.* www.asha.org/Practice-Portal/Professional-Issues/Telepractice/

American Speech-Language-Hearing Association. (2021). *Demographic profile of ASHA members providing bilingual services.* https://www.asha.org/siteassets/surveys/demographic-profile-bilingual-spanish-service-members.pdf

Budiman (2021). *Vietnamese in the U.S. Fact Sheet.* Pew Research Center. https://www.pewresearch.org/social-trends/fact-sheet/asian-americans-vietnamese-in-the-u-s-fact-sheet/

Castilla-Earls, A., Ronderos, J., McIlraith, A., & Martinez, D. (2022). Is Bilingual Receptive Vocabulary Assessment via Telepractice Comparable to Face-to-Face?. *Language, Speech, and Hearing Services in Schools*, *53*(2), 454-465. https://doi.org/10.1044/2021_LSHSS-21-00054

Chung, R. H., Kim, B. S., & Abreu, J. M. (2004). Asian American multidimensional acculturation scale: development, factor analysis, reliability, and validity. *Cultural diversity and ethnic minority psychology*, *10*(1), 66-80. https://doi.org/10.1037/1099-9809.10.1.66

Cycyk, L. M., De Anda, S., Moore, H., & Huerta, L. (2021). Cultural and linguistic adaptations of early language interventions: Recommendations for advancing research and practice. *American Journal of Speech-Language Pathology*, *30*(3), 1224-1246. https://doi.org/10.1044/2020_AJSLP-20-00101

Dam, Q., Pham, G., Potapova, I., & Pruitt-Lord, S. (2020). Grammatical characteristics of Vietnamese and English in developing bilingual children. *American Journal of Speech-Language Pathology*, *29*(3), 1212-1225. https://doi.org/10.1044/2019_AJSLP-19-00146

Domenech Rodríguez, M. M., Baumann, A. A., & Schwartz, A. L. (2011). Cultural adaptation of an evidence based intervention: From theory to practice in a Latino/a community context. *American journal of community psychology*, *47*(1), 170-186. https://doi.org/10.1007/s10464-010-9371-4

Du, Y., Sheng, L., & Salen, K. (2020). "Try your best": Parent behaviors during administration of an online language assessment tool for bilingual Mandarin-English children. In *IDC'20 proceedings of the ACM interaction design and children conference (virtual)* (pp.409–420). https://doi.org/10.1145/3392063.3394441

Ebert, K. D., & Pham, G. (2017). Synthesizing information from language samples and standardized tests in school-age bilingual assessment. *Language, Speech, and Hearing Services in Schools*, *48*(1), 42-55. https://doi.org/10.1044/2016_LSHSS-16-0007

Fitton, L., Bustamante, K. N., & Wood, C. (2017). The social validity of telepractice among Spanish-speaking caregivers of English learners: An examination of moderators. *International Journal of Telerehabilitation*, *9*(2), 13-24. https://doi.org/10.5195/ijt.2017.6227

Gagarina, N., Klop, D., Kunnari, S., Tantele, K., Välimaa, T., Bohnacker, U., & Walters, J. (2019). MAIN: Multilingual Assessment Instrument for Narratives–Revised. *ZAS Papers in Linguistics*, *63*, 20-20. https://doi.org/10.21248/zaspil.63.2019.516

Garcia, E. E. (1986). Bilingual development and the education of bilingual children during early childhood. *American Journal of Education*, *95*(1), 96-121.https://doi.org/10.1086/444294

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. https://doi.org/10.1080/17549507.2018.1444092

Heilmann, J. J., Rojas, R., Iglesias, A., & Miller, J. F. (2016). Clinical impact of wordless picture storybooks on bilingual narrative language production: A comparison of the 'Frog' stories. *International Journal of Language & Communication Disorders*, *51*(3), 339-345. https://doi.org/10.1111/1460-6984.12201

Ho, T. T., Pham, G. T., & Dam, Q. (2022). Reading attitudes in Vietnam: Initial study of the early school years. *Reading and Writing*, *35*(2), 303-323. https://doi.org/10.1007/s11145-021-10181-2

Lam, J. H. Y., Lee, S. M. K., & Tong, X. (2021). Parents' and students' perceptions of telepractice services for speech-language therapy during the COVID-19 pandemic: Survey study. *JMIR pediatrics and parenting*, *4*(1), e25675. DOI: 10.2196/25675

Lepkowsky, C. M. (2020). Functional Assessment of Currently Employed Technology Scale (FACETS) 4.0: Update on a Brief Intake Instrument to Facilitate Treatment Planning and Communication with Patients. *International Journal of Medical Science and Clinical Invention*, *7*(5), 4802-4809. DOI:10.18535/ijmsci/v7i05.03

Mayer, M. (1967). *A Boy, a Dog and a Frog*. Dial Books for Young Readers.

Mayer, M., & Mayer, M. (1975). *One Frog Too Many*. Dial Books for Young Readers.

McKenna, M. C., & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher, 43*(9), 626–639. https://www.jstor.org/stable/20200500

Miller, J., & Iglesias, A. (2012). Systematic Analysis of Language Transcripts (SALT) (Research Version 2012) [Computer software]. SALT Software.

Molini-Avejonas, D., Rondon-Melo, S., de La Higuera Amato, C. A., & Samelli, A. G. (2015). A systematic review of the use of telehealth in speech, language and hearing sciences. *Journal of telemedicine and telecare*, *21*(7), 367-376. https://doi.org/10.1177/1357633X15583215

NCBI. (2016). *Childhood speech and language disorders in the general U.S. population*. NIH National Library of Medicine. https://www.ncbi.nlm.nih.gov/books/NBK356270/

Nelson, N. W., & Plante, E. (2022). Evaluating the equivalence of telepractice and traditional administration of the Test of Integrated Language and Literacy Skills. *Language, speech, and hearing services in schools*, *53*(2), 376-390. https://doi.org/10.1044/2022_LSHSS-21-00056

Oetting, J. B. (2018). Prologue: Toward accurate identification of developmental language disorder within linguistically diverse schools. *Language, Speech, and Hearing Services in Schools*, *49*(2), 213-217. https://doi.org/10.1044/2018_LSHSS-CLSLD-17-0156

Parmar, P., Harkness, S., & Super, C. M. (2004). Asian and Euro-American parents' ethnotheories of play and learning: Effects on preschool children's home routines and school behaviour. *International Journal of Behavioral Development*, *28*(2), 97-104. https://doi.org/10.1080/01650250344000307

Peña, E. D., Gutiérrez-Clellen, V. F., Iglesias, A., Goldstein, B. A., & Bedore, L. M. (2018). Bilingual English Spanish Assessment (BESA). *Baltimore, MD: Brookes*.

Peña, E. D., & Sutherland, R. (2022). Can you see my screen? Virtual assessment in speech and language. *Language, Speech, and Hearing Services in Schools*, *53*(2), 329-334. https://doi.org/10.1044/2022_LSHSS-22-00007

Pham, G. (2015). *Working with an Interpreter to Analyze a Language Sample.* [Handout]. American Speech-Language-Hearing Association Webinar on Effective Interventions for Dual Language Learners. https://slhs.sdsu.edu/bdc/files/2018/11/Pham-2015-Handout-Language-sample-questions-for-Interpreters.pdf

Pham, G. (2016). Pathways for learning two languages: Lexical and grammatical associations within and across languages in sequential bilingual children. *Bilingualism: Language and Cognition*, *19*(5), 928–938. https://doi.org/10.1017/S1366728915000899

Pham, G. T., Pruitt-Lord, S., Snow, C. E., Nguyen, Y. H. T., Phạm, B., Dao, T. B. T., ... & Dam, Q. D. (2019). Identifying developmental language disorder in Vietnamese children. *Journal of Speech, Language, and Hearing Research*, *62*(5), 1452-1467. https://doi.org/10.1044/2019_JSLHR-L-18-0305

Pham, G., & Tipton, T. (2018). Internal and external factors that support children's minority first language and English. *Language, Speech, and Hearing Services in Schools*, *49*(3), 595–606. https://doi.org/10.1044/2018_LSHSS-17-0086

Pratt, A. S., Anaya, J. B., Ramos, M. N., Pham, G., Muñoz, M., Bedore, L. M., & Peña, E. D. (2022). From a distance: Comparison of in-person and virtual assessments with adult–child dyads from linguistically diverse backgrounds. *Language, Speech, and Hearing Services in Schools*, *53*(2), 360-375. https://doi.org/10.1044/2021_LSHSS-21-00070

Raman, N., Nagarajan, R., Venkatesh, L., Monica, D. S., Ramkumar, V., & Krumm, M. (2019). School-based language screening among primary school children using telepractice: A feasibility study from India. *International Journal of Speech-Language Pathology*, *21*(4), 425-434. https://doi.org/10.1080/17549507.2018.1493142

Ramirez, E., Dam, Q., Nguyen, K., & Pham, G. (2022, March 4-5). *Involving caregivers in telepractice assessment: Increasing adherence to testing procedures*. [Poster presentation]. San Diego State University Student Research Symposium, San Diego, CA, United States.

Snodgrass, M. R., Chung, M. Y., Biller, M. F., Appel, K. E., Meadan, H., & Halle, J. W. (2017). Telepractice in speech–language therapy: The use of online technologies for parent training and coaching. *Communication Disorders Quarterly*, *38*(4), 242-254. https://doi.org/10.1177/1525740116680424

Sutherland, R., Trembath, D., Hodge, A., Drevensek, S., Lee, S., Silove, N., & Roberts, J. (2017). Telehealth language assessments using consumer grade equipment in rural and urban settings: Feasible, reliable and well tolerated. *Journal of Telemedicine and Telecare*, *23*(1), 106-115. https://doi.org/10.1177/1357633X15623921

Thompson, L. C. (1963). The problem of the word in Vietnamese. *Word*, 19(1), 39-52. https://doi.org/10.1080/00437956.1963.11659787

Trần, T. N., & Bahr, W. (2015). Vietnamese parents' attitudes towards western-based behavioral parent training. *VNU Journal of Science: Education Research*, *31*(1). https://js.vnu.edu.vn/ER/article/view/176

Tucker, J. K. (2012). Perspectives of speech-language pathologists on the use of telepractice in schools: The qualitative view. *International journal of Telerehabilitation*, *4*(2), 47. DOI: 10.5195/ijt.2012.6102

Waite, M. C., Theodoros, D. G., Russell, T. G., & Cahill, L. M. (2010). Assessment of children's literacy via an internet-based telehealth system. *Telemedicine and E-Health*, *16*(5), 564-575. https://doi.org/10.1089/tmj.2009.0161
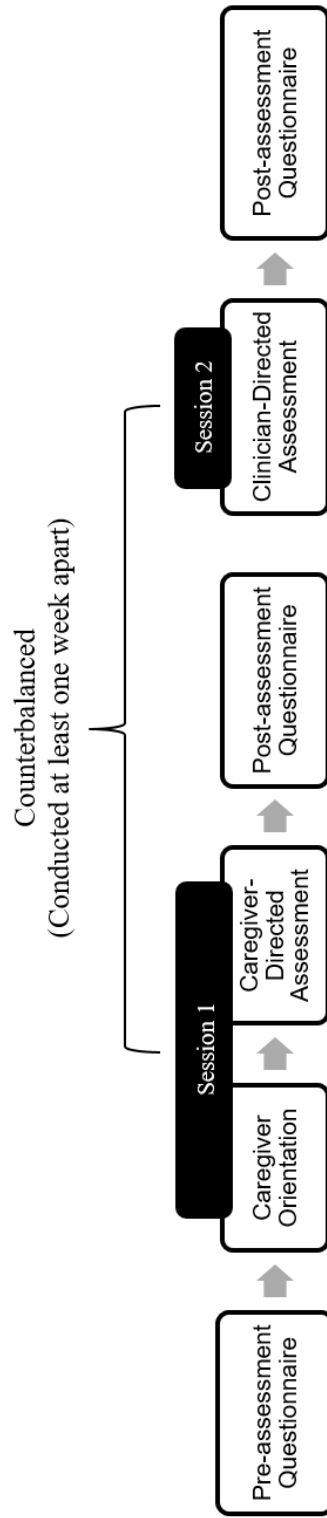
Tables & Figures

Figure 2.1
General Procedures. Sessions 1 and 2 are counterbalanced between the caregiver-directed condition (consisting of both the caregiver orientation and the caregiver-directed assessment) and the clinician-directed condition. Sessions 1 and 2 were conducted at least one week apart from each other.

Table 2.1

Children's Demographics (N=21)

Variable	M	SD
Age (Years)	5.31	1.08
Age of English onset (Year)[a]	2.59	1.66
Vietnamese Input (%)	45.73	28.33
Vietnamese Output (%)	46.72	31.66
English Input (%)	54.27	28.33
English Output (%)	53.28	31.66
ITALK - Vietnamese	3.94	0.72
ITALK - English	3.37	1.06
ITALK (Higher)	4.31	0.51
Mother's Education[b]	4.70	1.08
MLU Vietnamese[b]	6.07	2.10
NDW Vietnamese[b]	58.90	22.24
Total C-units Vietnamese[b]	38.70	13.02
MLU English[b]	5.15	2.75
NDW English[b]	51.35	31.43
Total C-units English[b]	32.05	27.21

Note. Vietnamese and English input and output measures are based on the Bilingual Input Output Survey (Peña et al., 2018) translated and adapted into Vietnamese (Pham & Tipton, 2018). ITALK = Instrument to Assess Language Knowledge (Peña et al., 2018) translated and adapted into Vietnamese (Pham et al., 2019). The ITALK asks caregivers to rate their child's Vietnamese and English abilities in 5 domains from a scale of 0-5, with 5 associated with more ability. ITALK (Higher) is the higher number between the Vietnamese and the English scores.
[a] = Missing 4 data points. [b] = Missing 1 data point.

Table 2.2

Caregiver's Demographics (N=21)

Variable	M	SD
Age (Years)	35.71	4.45
Years in US	15.95	10.39
Highest Education	4.86	1.20
FACETS Score	32.90	12.48
Vietnamese (average of 4 domains)	5.70	0.61
1. Vietnamese speaking	5.95	0.22
2. Vietnamese listening	5.86	0.36
3. Vietnamese Reading	5.62	0.97
4. Vietnamese writing	5.38	1.36
English (average of 4 domains)	3.81	1.95
1. English speaking	3.71	1.98
1. English listening	3.90	1.97
3. English Reading	3.76	2.00
4. English writing	3.76	1.92

Note. Highest Education = caregiver's highest level of education: 1 = Elementary, 2 Middle School, 3 = High School, 4 = Associate Degree/ Technical School, 5 = College, 6 = Master's Degree, 7 = Doctoral Degree. FACETS = Functional Assessment of Currently Employed Technology Scale (Lepkowsky, 2019). FACETS asks caregivers to rate their frequency of technology use in 5 domains: 0-14 = very infrequent IT use, 15-24 = infrequent, 25-34 = moderate, 35-44 = frequent, 45-50 = very frequent. Vietnamese and English skills are based on a six-point Likert scale, with 1 = not very well to 6 = very well (adapted from Chung et al., 2004).

Table 2.3

Child Questionnaire

Questions (English Version)	Average[a]		Caregiver-Directed[a]		Clinician-Directed[b]			
	M	**SD**	**M**	**SD**	**M**	**SD**	*p*	*d*
1. Now that you have completed the session, how do you feel?	3.05	0.56	3.32	0.58	2.85	0.81	0.07	0.44
2. How do you feel about speaking Vietnamese in the session?	2.73	0.79	2.95	0.97	2.55	0.94	0.17	0.33
3. How do you feel about the tasks you had to do in the session?	2.75	0.80	2.63	1.07	2.85	1.18	0.57	-0.13
4. How do you feel about having to sit still to complete the session?	2.45	0.72	2.47	0.96	2.45	1.05	1.00	0.00
Composite Score (average of #1-4)	2.74	0.52	2.84	0.62	2.68	0.67	0.43	0.18

Note. Children responded to the questions by choosing from a 4 point Likert scale, where 4= very happy. The clinician read aloud each item in Vietnamese or English, and the child could respond verbally or by pointing to the picture scale. The bilingual version of this questionnaire can be available from the first author upon request.

[a] = Missing 2 data points. [b] = Missing 1 data point.

Table 2.4

Caregiver Questionnaire

Questions (English Version)	Average[a]		Caregiver-Directed		Clinician-Directed[a]			
	M	**SD**	**M**	**SD**	**M**	**SD**	***p***	***d***
1.Overall, my child had a positive experience during this session	4.43	0.71	4.33	0.91	4.55	0.60	0.16	-0.32
2.My child was attentive during this session	4.07	0.80	4.14	0.85	4.05	0.89	0.38	0.20
3.The tasks were difficult for my child[b]	2.71	0.64	2.67	0.86	2.75	0.85	0.69	-0.09
4.In this session, my child spoke less than usual[b]	3.07	1.02	3.00	1.14	3.10	1.07	0.45	-0.17
5.Overall, I had a positive experience during this session	4.40	0.56	4.29	0.78	4.55	0.51	0.14	-0.35
6.I felt comfortable using technology with my child for this session	4.52	0.49	4.57	0.51	4.50	0.51	0.16	0.32
7.The length of this session was too long[b]	2.43	0.62	2.29	0.72	2.60	0.88	0.21	-0.29
8.There were technical difficulties that interfered with this session[b]	2.05	0.80	2.14	1.06	1.95	0.76	0.33	0.22
Composite Score (average of #1-8)	3.90	0.45	3.90	0.54	3.91	0.45	0.84	0.04
Composite: Caregiver-Reported Child's Experience (average of #1-4)	3.68	0.59	3.70	0.69	3.69	0.58	0.68	0.09
Composite: Caregiver's Experience (average of #5-8)	4.11	0.44	4.11	0.52	4.13	0.50	0.91	-0.03

Note. Caregivers responded based on a 5 point Likert scale: 5= strongly agree, 4=agree, 3=neither agree nor disagree, 2=disagree, 1=strongly disagree. This written questionnaire was in Vietnamese and English. The bilingual version of this questionnaire can be available from the first author upon request.
[a] = Missing 1 data point. [b] = Responses were reversed for these questions when calculate the composite scores.

Table 2.5

Language Sample Measures

Variable	Caregiver-Directed		Clinician-Directed	
	M	**SD**	**M**	**SD**
MLU	5.33	1.36	5.71	1.52
NDW	50.52	19.46	46.38	11.67
Total # of C-units	29.33	9.88	26.62	9.09
Production	30.24	15.59	25.92	13.90
Comprehension (%)	44.00 [a]	22.63	47.22	21.66
Comprehension No IST Questions (%)	61.25 [a]	25.29	62.50	20.92

Note. MLU = mean length of utterance, NDW = Number of different words, C-units = modified communication units (Miller & Iglesias, 2012), Production = story production scores (Gagarina et al., 2019), Comprehension = story comprehension scores (Gagarina et al., 2019). Comprehension (No IST Questions) excludes six out of ten questions that asks about characters' internal state terms. There were no significant differences among the language sample measures between implementation conditions, Wilk's Lamba = .548, F (6, 14) = 1.922; *p* = .147.
[a] = Missing 1 data point.

Table 2.6

Bivariate Correlations

	Child's Survey Composite	Caregiver-Reported Child's Experience	Caregiver's Experience
Child's Survey Composite		0.585**	0.232
Caregiver-Reported Child's Experience	0.585**		0.547*
Caregiver's Experience	0.232	0.547*	
Child's Age	0.177	-0.114	-0.077
Child's Sex	0.050	0.150	0.275
US Born	-0.453*	-0.200	0.225
Age of English Onset	-0.280	-0.070	0.054
ITALK Vietnamese	0.356	0.019	-0.061
ITALK English	-0.167	-0.349	-0.231
ITALK Higher	0.503*	0.191	0.274
Vietnamese MLU	0.429	0.175	0.361
Vietnamese NDW	0.670**	0.544*	0.368
Vietnamese Total number of C-units	0.469*	0.493*	0.192
English MLU	0.065	-0.080	-0.073
English NDW	0.153	-0.023	0.045
English Total number of C-units	0.447	0.132	0.004
FACETS	0.282	0.403	0.046
Caregiver's Education	0.040	0.056	0.209
Caregiver's Vietnamese Proficiency	-0.016	0.007	-0.273
Child's Vietnamese Input	0.272	0.338	0.197
Child's Vietnamese Output	0.264	0.426	0.209

Note. Bivariate correlations are displayed. US Born: 1 = child born in the US, 0 = child born outside of the US. ITALK = Instrument to Assess Language Knowledge (Peña et al., 2018) translated and adapted to Vietnamese (Pham & Tipton, 2018). ITALK Higher = higher score between Vietnamese and English scores. MLU = mean length of utterance, NDW = number of different words, C-units = modified communication units (Miller & Iglesias, 2012): measures using retell stories (Mayer, 1967 & Mayer & Mayer, 1975). FACETS = Functional Assessment of Currently Employed Technology Scale (Lepkowsky, 2019). Caregiver's Vietnamese Proficiency = average of 4 self-rated language domains (see Table 2.2). Child's Vietnamese input/ output measures are based on the Bilingual Input Output Survey (Peña et al., 2018), translated and adapted to Vietnamese (Pham et al., 2019).
* $p < .05$, ** $p < .01$.

CHAPTER 3

Capitalizing on cross-language similarities in intervention with bilingual children

Capitalizing on cross-language similarities in intervention with bilingual children

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ABSTRACT

Purpose: This study examined the effects of a vocabulary intervention for bilingual children that was conducted in children's first language, Spanish, and included explicit instruction on cognates. We measured effects in terms of change from pre- to post-intervention in Spanish as well as associations with the non-target language, English.
Method: Participants were 12 Spanish-English bilingual children, aged 6–8 years, with and without Developmental Language Disorder. Children completed the intervention in pairs (one child with DLD and a typically developing peer) for 70-minute sessions, 3 days a week, for four weeks. Intervention targeted 32 words (16 cognates, 16 non-cognates) using four storybooks (8 words/book) and interactive activities that highlighted similarities across languages. Pre- and post-intervention measures in Spanish and English included tasks of word definition and cognate facilitation.
Results: As a group, children showed improvement in definition quality and cognate naming in Spanish. There was a positive correlation between definition quality and cognate naming for the typically developing children, but not for the children with DLD. All children showed positive cross-language correlations on post-intervention measures.
Conclusions: Bilingual children, with and without DLD, have the capacity to improve in their awareness and use of cognates. Explicit teaching of cognates can be an effective tool for building vocabulary skills. Children with DLD may need additional time and support to apply their knowledge of cognates to vocabulary learning.

1. Introduction

In the past two decades, there has been a marked increase in the number of intervention studies of bilingual children with language disorders who speak a minority first language (L1) and a majority second language (L2: English in the US, French in Quebec, Canada). Mounting evidence indicates that bilingual approaches to intervention are just as effective as L2-only approaches in supporting the majority L2 (for reviews, see Ebert & Kohnert, 2016; Kay-Raining Bird, Genesee, & Verhoeven, 2016; Lim, O'Reilly, Sigafoos, Ledbetter-Cho, & Lancioni, 2019). Systematic reviews have also found that bilingual approaches to intervention promote gains in children's L1 and L2, whereas L2-only approaches support gains solely in the L2 (Ebert & Kohnert, 2016; Kay Raining-Bird

et al., 2016; Lim et al., 2019). Ebert and Kohnert (2016) reviewed nine empirical studies of preschool and school-age bilingual children with developmental language disorder and found that L2-only approaches had minimal transfer effects to improve the L1; in contrast, bilingual approaches contributed to gains in both languages. Kay Raining-Bird et al. (2016) reviewed intervention studies of bilingual children with other language disorders such as Down syndrome and autism spectrum disorders. This review across language disorders also found that bilingual approaches supported L1 and L2 development. Collectively, empirical evidence suggests that bilingual approaches to intervention are superior to L2-only approaches because they support majority language outcomes and continued development in the L1 (see also Rolstad, Mahoney, & Glass, 2005; Valentino & Reardon, 2015, for reviews of bilingual programs in regular education).

In their review across language disorders, Kay-Raining Bird et al. (2016) identified a need for studies that exclusively target the L1 to address whether L1-only intervention can also promote gains in two languages. It may seem counterintuitive to provide intervention solely in a minority language, particularly when it is not the language of school instruction. However, there are many benefits of bolstering the L1. Strengthening the L1 can promote closer family cohesion (Park, Tsai, Liu, & Lau, 2012; Tseng & Fuligni, 2000), a stronger sense of identity (Phinney, Romero, Nava, & Huang, 2001), and overall better health outcomes (Mulvaney-Day, Alegria, & Sribney, 2007). Bilingualism and biliteracy have also been connected to higher levels of academic achievement and community engagement (e.g., Bankston & Zhou, 1995). Given the long-term advantages of L1 maintenance, the benefits far outweigh the cost for educational programming that systematically supports the L1 alongside overall dual language development.

The present study consists of an educational intervention that targets Spanish as the L1. We include typically developing bilingual children as well as bilingual children with Developmental Language Disorder (DLD). DLD (also referred to as specific or primary language impairment) is characterized by low language performance despite otherwise normal development (Bishop, Snowling, Thompson, Greenhalgh, & Catalise-2 Consortium, 2017), and bilingual children with DLD, by definition, show low performance in both languages (Kohnert, 2010). While all bilingual children who speak a minority L1 are at risk for L1 attrition (Pearson, 2007), bilingual children with DLD are at greater risk because they must confront these same social factors with a weakened language-learning system (Ebert, Pham, & Kohnert, 2014; Kohnert, 2010). Support for a minority L1 can benefit all bilingual children, regardless of language ability status.

The present intervention study targets two areas of language: vocabulary knowledge and cognate facilitation. Prior to presenting study details, we review the literature on how vocabulary knowledge has been measured and targeted in intervention, and on the role of cognate facilitation in education.

1.1. Vocabulary knowledge

Vocabulary is one of the key elements of language and a significant predictor of reading comprehension and academic achievement (Proctor, Carlo, August, & Snow, 2005). One way to assess vocabulary knowledge is to measure vocabulary depth, which refers to the richness of the semantic representation of known words. As implied by its name, vocabulary depth requires a "deeper" understanding of the elements of words, including related morpho-syntactic structures, multiple meanings, and pragmatic rules for using the words. One measure of vocabulary depth is word definition. Definition quality has been scored in terms of the inclusion of key characteristics, the use of superordinate labels, and the ability to convey word meaning (Ordóñez, Carlo, Snow, & McLaughlin, 2002). For bilingual children, vocabulary depth may be more related across languages than vocabulary breadth, which is commonly measured using single word vocabulary tests (Ordóñez et al., 2002; Pham, Donovan, Dam, & Contant, 2018).

Vocabulary knowledge has been a primary focus of language intervention. Restrepo, Morgan, and Thompson (2013) conducted a vocabulary intervention for bilingual children with DLD, aged 4–5. Intervention included dialogic reading, interactive activities, repeated vocabulary use, and providing rich definitions and explanations of target words. Intervention was provided in one of two conditions: English-only or bilingually in Spanish and English. They found that children in both intervention conditions improved more than control groups, and that children who received the bilingual intervention out-performed the other groups, suggesting that an intervention with these elements may help bilingual children with DLD develop vocabulary knowledge that is vital for academic achievement (Restrepo et al., 2013).

Vocabulary knowledge is also a prime target in classroom instruction. In a literature review of vocabulary instruction in regular education, August, Carlo, Dressler, and Snow (2005) noted that certain instructional practices used with monolingual children are also useful for bilingual children, including providing definitional and contextual information about word meaning, actively involving students in word learning, providing multiple exposures, and teaching word analysis. Hickman, Pollard-Durodola, and Vaughn (2004) provided a detailed description of many of these practices and included example lesson plans for bilingual children. Finally, August et al. (2005) identified practices that are particularly effective for bilingual learners, one of which was taking advantage of children's first language through the use of cognates.

1.2. Cognate facilitation

Cognates are words that share form and meaning between two languages (e.g., *elephant* in English, *elefante* in Spanish). Cognate pairs can vary in terms of phonological transparency and orthographic overlap. Instruction on cognates has conventionally focused on the orthographic overlap to help older elementary students who are already literate in Spanish extract meaning from English texts (e.g., Malabonga, Kenyon, Carlo, August, & Louguit, 2008). However, children who are not literate in Spanish but have verbal proficiency could also benefit from cognate instruction (August, Carlo, Dressler, & Snow, 2005). Relatively fewer studies have examined cognate knowledge in preschool and younger school-age children. Of the handful of studies that have examined cognates in spoken language (i.e., phonological cognates), findings suggest that preschool and early school-age children also show a degree of

cognate facilitation, operationally defined here as more accurate or faster performance on cognate versus non-cognate items (Kelley & Kohnert, 2012; Sheng, Lam, Cruz, & Fulton, 2016).

Sheng et al. (2016) examined cognate facilitation in monolingual and bilingual children, aged 4–7, using a facilitation task that controlled for phonology, word frequency, and length of cognate and non-cognate words. Bilinguals completed cognate facilitation tasks in both of their languages. Results showed that Spanish-English bilinguals were able to name more cognates than non-cognates, and that cognate facilitation occurred in both the Spanish and English versions of the task. As anticipated, English-speaking monolinguals and Mandarin-English bilinguals did not show differences in their performance on these two sets of words (Spanish-English cognates vs. non-cognates).

To our knowledge, only two studies have examined cognate facilitation in children with DLD. Using a timed picture identification task presented in Spanish, Kohnert, Windsor, and Miller (2004) found that monolingual English-speaking children with and without DLD responded with greater accuracy and speed on items with greater phonological overlap between Spanish and English than on items with less overlap. Although children with DLD were less accurate and slower to respond than their typically developing peers, both groups benefited from high phonological overlap and demonstrated similar patterns of performance.

Grasso, Peña, Bedore, Hixon, and Griffin (2018) examined cognate performance with 117 bilingual children, aged 5–9 years, using naming accuracy on a standardized expressive vocabulary test. Similar to monolingual peers (i.e., Kohnert, Windsor, & Miller, 2004), bilingual children with DLD performed lower than their typically developing (TD) bilingual peers. However, both TD and DLD groups performed more accurately on cognates than non-cognates, and cognates were more likely to be named in both languages than non-cognates. Collectively, this emerging literature suggests that bilingual children with language disorders, though lower in accuracy overall, show a similar pattern of cognate facilitation as their TD peers.

While surface similarities may be available for languages such as Spanish and English, it is not a given that children will be able to capitalize on these cross-language similarities to learn new words. Pham, Guan, Zoph, Le and Dean (2018) namese or Spanish as the primary home language (L1). Children were matched on English (L2) proficiency and were divided into three groups based on their proficiency level in the L1: low Spanish, high Spanish, and low Vietnamese proficiency. Participants completed two brief training sessions to learn a set of words and definitions in their L1 (Spanish or Vietnamese), and outcomes were measured bilingually. Pham, Donovan et al. (2018) found that all groups on average showed improvement on L1 measures at post-assessment, indicating growth of vocabulary knowledge in the language targeted in training (Spanish or Vietnamese).

When comparing outcomes from the two low L1 proficiency groups, the Spanish-speaking group showed better L1 performance on cognates versus non-cognates. (The Vietnamese-speaking group did not show a difference in performance across words because Vietnamese and English do not share cognates). When comparing the two Spanish-speaking groups, only the group with high Spanish proficiency showed increases on the (untaught) English equivalents at post-assessment. These findings suggested that while both low and high proficiency Spanish-speaking groups showed sensitivity to cognates, only bilinguals with high Spanish proficiency were able to capitalize on these cross-language similarities to transfer their newly learned skills from the L1 to English.

Although some of the target words in Pham, Donovan et al. (2018) were Spanish-English cognates, the brief training sessions did not highlight cross-language similarities as a word-learning strategy. Thus, findings from Pham, Donovan et al. (2018) leave open the question of whether children with low L1 proficiency could benefit from explicit instruction on how to use cognates to learn new words.

1.3. The present study

The purpose of this study was to investigate the effects of a cognate-based vocabulary intervention for bilingual children with and without DLD. Intervention was conducted in Spanish to bolster children's minority L1, and outcomes were measured bilingually. The present study expanded on procedures from Pham, Donovan et al. (2018) to include a longer duration for intervention, explicit cognate instruction, and the addition of bilingual children with DLD. Specifically, we ask

(1) Did children improve in the two target areas of intervention, namely vocabulary knowledge and cognate facilitation?
(2) Was change in cognate facilitation related to change in vocabulary knowledge?
(3) Were there improvements in following intervention in the untaught language, English? Was performance related between languages?

Note that Questions 1 and 2 focused on outcomes in the language of intervention, Spanish (L1) whereas Question 3 focused on the transfer of skills to English (L2). We anticipated that all children would make a certain degree of improvement in the target areas, and that TD children would make relatively greater improvement, given their language ability status. We anticipated that all children would show a degree of cognate facilitation, independent of language status (e.g., Grasso, Peña, Bedore, Hixon, & Griffin, 2018), and that cognate facilitation would be related to vocabulary knowledge (e.g., Pham, Donovan, et al., 2018). Finally, we anticipated a certain degree of improvement in English for cognate facilitation and positive relationships between languages (e.g., Ordóñez et al., 2002).

2. Methods

2.1. Participant recruitment and general procedures

This study was approved by the university's institutional review board and the school district's research board. Participant recruitment included bilingual children, with and without DLD, from four elementary schools within a large urban school district in Southern California. Recruitment was completed in two phases in a one-month period. Phase 1 targeted children with DLD. School-based speech-

language pathologists (SLPs) were asked to identify children on their caseloads who fit the inclusion criteria, i.e., from a Spanish-speaking home with a diagnosis of DLD and no other diagnoses. Four SLPs identified ten potential students for the study. SLPs gave parents a recruitment packet, which included a written study summary, consent form, and one-page parent questionnaire. SLPs and the research team were available by phone or in person to answer any questions. When parents provided written consent, SLPs then provided contact information (e.g., names and phone numbers) to the research team. Finally, a trained bilingual graduate research assistant called each family to discuss the study, address any questions, and verbally confirm parents' written consent.

Phase 2 of recruitment targeted TD children from the same schools and grade levels (kindergarten through grade 2) as the DLD group. The research team collaborated with SLPs and classroom teachers to distribute recruitment packets to children who fit the inclusionary criteria, i.e., from Spanish-speaking homes and not receiving speech-language services. Like Phase 1, once the research team received written parent consent, a trained bilingual research assistant contacted parents by phone to review the study and verbally confirm consent.

Prior to intervention, parents agreed to have their children complete individual assessment measures at children's school sites in a quiet area during the school day. They also agreed to bring their child to the university's speech-language clinic to participate in the six-week program and were compensated $150 for transportation. Intervention and post-intervention assessments were conducted at the clinic during school break in the summer months.

2.2. Participants

Twelve children (7 girls, 5 boys), aged 6–8 years (kindergarten through grade 2), participated in this study. Participants came from Spanish-speaking homes and received school instruction in English. Eleven of the 12 participants also received biliteracy instruction in Spanish and English as part of their school day. Based on the parent questionnaire, participants were first exposed to Spanish only or to Spanish and English simultaneously. Of the children who were first exposed to Spanish only, the age of English onset was reported to be 3 or 4 years. Parents spoke to their children in Spanish "most of the time" (50 % of sample), "all the time" (25 % of sample), or "some of the time" (25 % of sample). Mothers' education ranged from less than high school (50 % of sample), college (25 % of sample), high school (17 % of sample), to more than 4 years of university (8% of sample).

Six participants (five girls, 1 boy) were typically developing (TD): there were no parent or teacher concerns about children's language development and no history of special education services. Two TD children were fraternal twins. There were no other familial relationships to report. Six participants (2 girls, 4 boys) had a diagnosis of DLD and no other developmental concerns. One participant with DLD had an articulation goal for /r/ in addition to their language goals outlined in the Individualized Education Plan.

Prior to intervention, direct language measures and parent report were used to verify language ability status. Table 1 shows results from a set of standardized language tests in Spanish and in English that included two comprehensive tests of language: the Clinical Evaluation of Language Fundamentals, 4th edition (CELF-4; Semel, Wiig, & Secord, 2003) in Spanish and the CELF-5 (Wiig, Semel, & Secord, 2003) in English; and two vocabulary tests in each language: the Receptive One-Word Picture Vocabulary Test (ROWPVT; Brownell, 2000b), and Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000a). Whereas test manuals outline a bilingual administration, vocabulary tests were administered in a single language for this study in order to capture children's vocabulary knowledge separately in English and in Spanish. As shown in Table 1, TD children performed within 1 SD of the mean on the CELF in at least one language, confirming their typical language ability status. Children with DLD performed 1 SD below the mean on the CELF in both languages, and most children with DLD performed 2 SD below the mean.

Table 1
Participant Characteristics.

	TD			DLD			p value
	Mean	SD	Range	Mean	SD	Range	
Age (months)	88	12	76 – 103	96	9	84 – 105	.190
Spanish							
CELF	95	17	73 – 120	58	15	43 – 86	.011*
ROWPVT	88	18	55 – 107	71	9	55 – 78	.041*
EOWPVT	89	20	56 – 110	56	2	55 – 61	.004**
English							
CELF	93	20	74 – 129	66	13	45 – 81	.011*
ROWPVT	94	11	84 – 111	73	13	55 – 90	.015*
EOWPVT	98	20	79 – 124	93	14	79 – 116	.606
ITALK	4.44	0.74	3.2 – 5.0	3.67	0.41	3.2 – 4.4	.134
Spanish Input	67	17	50 – 85	57	14	38 – 78	.299
Spanish Output	56	27	29 – 85	55	16	40 – 83	.968

Note. Standardized test results are reported as standard scores. CELF = Clinical Evaluation of Language Fundamentals, 5th edition for English (Wiig et al., 2003) and 4th edition for Spanish (Semel et al., 2003); ROWPVT = Receptive One-Word Picture Vocabulary Test (Brownell, 2000b); and EOWPVT = Expressive One-Word Picture Vocabulary Test (Brownell, 2000a); ITALK = Inventory to Assess Language Knowledge (Peña et al., 2018) is reported in the highest language (English or Spanish); Spanish input and output are based on the Bilingual Input-Output Survey (Peña et al., 2018). English input/output are the inverse of the Spanish values. Between-group comparisons were conducted using Mann-Whitney nonparametric tests.

* $p < .05$.

** $p < .01$.

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In addition to direct language measures, parents completed the Inventory to Assess Language Knowledge (ITALK), a survey measure from the Bilingual English-Spanish Assessment (BESA: Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2018) that asks parents to rate children's skills in five areas of speech, vocabulary, sentence production, grammar, and listening comprehension on a five-point rating scale (1 − lowest). Mean scores across all five areas were calculated for Spanish and English separately. According to Peña et al. (2018), mean scores below 4.18 in the higher-rated language indicates a risk for DLD. Notably, the DLD group had an average ITALK score of 3.67, well below the cut score of 4.18. Using Mann-Whitney nonparametric tests to compare groups, the DLD group performed lower than the TD group on all language ability measures except for the English EOWPVT (see Table 1).

Finally, children's language exposure was documented using a one-page questionnaire and the Bilingual Input-Output Survey (BIOS; Peña et al., 2018), another survey measure from the BESA. The BIOS asks parents to report on their children's hourly language input and output to capture their language exposure in a typical week. As shown in Table 1, participants had relatively equal amounts of exposure to Spanish and English, and this equal exposure was related to their participation in biliteracy programs in school. Mann-Whitney tests confirmed that there were no group differences in language exposure between TD and DLD groups (see Table 1).

2.3. Intervention

Participants attended a six-week program that was conducted three days per week for 70 min per day. In the first week of the program, children completed assessments specific to the targeted words and orientation to the program and their dyads (e.g., ice-breaker activities). Intervention occurred in the next four weeks, and the last week of the program consisted of assessments after intervention. Attrition rates were low with only two children missing one session each and one child missing two sessions.

Intervention was conducted at a university speech-language clinic by two bilingual Spanish-English graduate student clinicians who were supervised by a licensed Spanish-speaking speech-language pathologist. Both graduate student clinicians completed a bilingual certificate program that requires successful completion of a statewide Spanish proficiency test of speaking, listening, reading, and writing as well as 100 clinical practicum hours working with bilingual clients under the supervision of a bilingual speech-language pathologist.

Intervention consisted of Mediated Learning Experiences (MLEs: Lidz, 1991) in order to promote active learning and generalization. Four key features of MLEs were used during the intervention (Lidz, 1991): intentionality, meaning, transcendence, and competence. Intentionality consisted of a clear statement of the session's goal (e.g., *Today we are going to learn new words and how to define them*). Meaning consisted of an explanation of the goal (e.g., *Learning new words helps us understand what we hear and read*). Transcendence made connections between how these new skills could be applied to other contexts (e.g., *It is important to learn new words in Spanish to talk to your family*). Competence consisted of statements to promote self-monitoring of the learning process (e.g., *At first there were many words you didn't know, but after the lesson, you have…*). These four MLE features were embedded into each session.

Intervention consisted of four storybooks and related activities (one book per week) using MLEs throughout the session. Sample intervention protocols are included as Supplemental Materials in the original Spanish (Supplemental Material: Training Protocol) and translation (Supplemental Material: Training Protocol - English translation) that clinicians used to conduct intervention for Days 1, 2, and 3 of the first storybook. Each clinician worked with two children within a session, one child with DLD and one TD child. Intervention was conducted in Spanish and focused on building vocabulary knowledge and cognate facilitation. As shown in Table 2, activities included storybook reading, matching words to definitions, creating sentences with the target words, story retell, and cognate-specific activities. Children were given short breaks when needed. Appendix A provides a detailed description of intervention activities.

2.3.1. Treatment fidelity

Prior to intervention, training for the two graduate student clinicians consisted of an independent review of the materials and several meetings to role-play activities and discuss how to approach particular child responses and behaviors. Clinicians piloted the intervention with at least one child who would not be part of the study and met with the research team afterwards to address any remaining questions. All sessions were video recorded and reviewed on a weekly basis during team meetings.

Video recordings (20 % of all the sessions) were scored for treatment fidelity by two trained raters fluent in Spanish. Consistent with Pham, Donovan et al. (2018), treatment fidelity was scored based on three categories: adherence to the intervention scripts, consistent use of Spanish, and activity length. Adherence to the intervention scripts was scored using a checklist to ensure that the clinician included specific components of the script: inclusion of the MLEs, review of the target words and definition, reading the story script, completing the cognate activity, and completing vocabulary games (matching, creating sentences, and story retell). Adherence to the intervention scripts was scored as an average of 94 % for Clinician 1 (range 83%–100%) and 99 % for Clinician 2 (range 92%–100%). Consistent Spanish use by the clinician was measured using a time interval observation method (e.g., Olswang, Svensson, Coggins, Beilinson, & Donaldson, 2006), in which the first 15 min of each session were divided into 30-second intervals, and each time interval was scored as 1 − used solely Spanish; 0 − used both Spanish and English; NA − silent interval. The percentage of intervals in which the clinicians spoke solely in Spanish was 100 %. Finally, the average session length was 62 min for Clinician 1 (range of 53 minutes–71 minutes) and 56 min for Clinician 2 (range of 43 minutes–70 minutes) not including transition times.

2.3.2. Target vocabulary and dosage

Target words were 32 Spanish words based on four storybooks used during intervention (8 words per storybook). Target words were Tier 2 words (Beck, McKeown, & Kucan, 2013), namely high-frequency words that go beyond everyday conversation and that

Table 2
Summary of Intervention Schedule and Activities.

Day	Activity (Approximate Time)
Day 1	Introduction: Introduce the goal and plan (~5 min)
	Target Words: Introduce 8 target words (~10 min)
	Book Activity: Read storybook while reviewing target words (~15 min)
	Break Time/Cognate Teaching: Break time while playing a cognate iPad activity (~15 min)
	Matching: Match target words to definition with a card game (~10 min)
	Creating Sentences: Create sentences using target words (~20 min)
	Ending: Closing statements (~2 min)
Day 2	Introduction: Introduce the goal and plan (~5 min)
	Target Words: Reviews 8 target words (~10 min)
	Book Activity: Read storybook while reviewing target words (~15 min)
	Break Time/ Cognate Teaching: Break time while identifying similarities in cognate words (~15 min)
	Matching: Match target words to definition with a card game (~10 min)
	Story Retell: Retell the main events in the story using a storybook App on the iPad. (~20 min)
	Ending: Closing statements (~2 min)
Day 3	Introduction: Introduce the goal and plan (~5 min)
	Target Words: Reviews 8 target words and definitions (~15 min)
	Book Activity: Read storybook while reviewing target words (~15 min)
	Break Time/ Cognate Teaching: Break time while identify cognate words (~15 min)
	Creating sentences: Create sentences using cloze sentence activity (~20 min)
	Ending: Closing statements (~2 min)

Note. Day 1–3 activities were completed for each storybook.

are used across multiple content areas. Target words were matched on word frequency using a Spanish language corpus (Moreno-Sandoval et al., 2005). As shown in Appendix B, 16 of the 32 words (4 per storybook) were cognates between Spanish and English. All words were scored using the Crosslinguistic Overlap Scale for Phonology (COSP; Kohnert et al., 2004) to determine the phonological overlap in initial sound, number of syllables, vowels, and consonants between the Spanish word and its English equivalent. Target words that were cognates had an average COSP score of 6.94 (range of 6–8). Target words that were non-cognates had an average COSP score of 1.25 (range of 0–4). Target words were also divided into nouns and non-nouns (i.e., adjectives or verbs) for each cognate and non-cognate word group. Definitions for the target words were selected from online dictionaries and modified by Spanish-speaking clinicians on the research team to be easily understood by young children (see Appendix B for a complete list of target words and definitions).

As shown in Appendix A, the number of exposures to each target word ranged from 38 to 41 across the three sessions of a given storybook. This dosage is consistent with recent evidence on the intensity needed to promote word learning for children with DLD. Using an interactive book reading intervention, Storkel et al. (2019) compared three combinations of dose (i.e., number of exposures to the target word in one session) and dose frequency (i.e., number of repeated sessions) that totaled 36 exposures for each target word. Storkel et al. (2019) found that 36 exposures is an adequate intensity for intervention with children with DLD, no matter the dose-dose frequency combination. In the present study, each child had the same number of opportunities to listen and respond to the target words in each session (see Appendix A for dosage and Supplemental Material: Training Protocol for detailed intervention scripts).

2.3.3. Materials

Storybooks, iPad applications, a whiteboard, and tabletop game activities were used during the intervention. We selected storybooks that were available in both English and Spanish. Story scripts were then created for each book to retain the general storyline and control for target word exposure. Each target word was repeated five times within a story script.

Story-related activities were conducted using an iPad as well as tabletop interactive games. The iPad was used to present pictures from the story, and to audio- or video-record story retells. Tabletop activities included pre-made vocabulary cards, sentence strips, and board games. Commercial board games were modified in order to integrate storybook themes. Cognates were explicitly taught using a game presented on the iPad, as well as table-top activities to explain the concept of cognates and to provide opportunities for practice in identifying similarities between words in Spanish and English (see Table 2 and Appendix A).

2.4. Pre- and post-intervention measures

Participants completed measures of vocabulary improvement and cognate facilitation in Spanish and English before and after intervention. Vocabulary was measured using a word definition tasks to assess depth of knowledge (cf. Ordóñez et al., 2002)[1] . Cognate facilitation was measured using a cognate facilitation task, in which we compared accuracy in naming cognates vs. non-cognates.

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[1] Progress on the target words was originally measured using tasks of picture identification and word definition. However, many target words represented abstract concepts and could not be clearly depicted using static pictures. Thus, we omitted picture identification and measured vocabulary knowledge using word definition tasks only.

2.4.1. Word definition

In this task, children were asked to define target vocabulary using their own words. Before the introduction of each storybook (Day 1), children were asked to define the 8 target words from a given storybook in Spanish. After the completion of intervention, children defined all 32 target words in Spanish and in English. Due to an oversight during assessment, definition quality in English was solely collected after intervention (i.e., not at pre-intervention). Definitions were digitally audio recorded and later transcribed using SALT software (Miller & Iglesias, 2008). One research assistant transcribed the audio recording and another research assistant re-listened to all samples to check for transcription accuracy (cf., Ebert & Pham, 2017).

Definitions were scored using the scoring system from Pham, Donovan et al. (2018), which was adapted from the scoring system outlined in Ordóñez et al. (2002). Scoring consisted of two components: syntagmatic knowledge (SK) and communicative adequacy (CA). SK consists of key characteristics of the target word in categories (i.e., size, quantity, shape, color, composition, parts, location, function, and use) with a score of one point for each characteristic and a maximum of 3 points per category. CA measures how well children are able to convey the meaning of a word to an unfamiliar listener. CA was scored using a 4-point scale: 0 = listener unable to identify the target word based on the given definition, 1 = unable to identify the target word due to misleading or overly broad information, 2 = able to narrow down the target word to 2–3 potential words, and 3 = clearly able to identify the target word based on the definition provided.

Dependent variables were separate scores for SK and CA and the composite score (sum of SK and CA) for all 32 target words. Inter-rater reliability was based on all definitions and calculated as the proportion of agreements of 384 definitions (32 definitions * 12 participants) for each language, at each time of testing (pre- or post-intervention). Two independent trained research assistants scored SK and CA, and discrepancies between raters were discussed among the research team. Raters then re-scored based on team decisions. Final inter-rater reliability for Spanish at pre-intervention was 99 % for SK and 93 % for CA; at post-intervention, reliability was 100 % for SK and 94 % for CA. (Word definition in English at pre-intervention was not collected).

2.4.2. Cognate facilitation task

In this task (adapted from Sheng et al., 2016), children were shown a picture and were asked to name it. Cognate facilitation tasks were completed in Spanish and English, before and after intervention. Each task had 28 items, of which 14 items were cognates and 14 items were non-cognates. Items were matched on a variety of features including frequency, age of acquisition, and word length (Sheng et al., 2016). These items were different from the target words in the intervention. The cognate facilitation task was used as a measure of cognate facilitation, calculated as the percentage of cognates named correctly from pre- to post-intervention, compared to the percentage of non-cognates named correctly from pre- to post-intervention.

2.5. Data analysis

Analytical procedures consisted of group-level analyses using nonparametric tests that are suitable for small sample sizes (Siegel & Castellan, 1988) as well as visual inspection of individual child data. In a preliminary analysis, we made between-group comparisons using Mann-Whitney tests to verify whether TD and DLD groups were similar on demographic variables (e.g., age) and different on measures of language ability (see Table 1). We then conducted Wilcoxon Signed Ranks tests for the whole sample (N = 12) to measure changes from pre- to post-intervention. In order to control for multiple comparisons, we employed the Benjamini and Hochberg (1995) procedure for the five planned pre-to-post comparisons in Spanish (SK, CA, definition composite, cognate naming, and non-cognate naming) and the two planned pre-to-post comparisons in English (cognate and non-cognate naming). We report p values from exact tests and individual-level change within each group (TD and DLD). Finally, we examined relations between Spanish and English performance using Spearman's Rank correlations and the Benjamini and Hochberg (1995) correction for five planned cross-language correlations of the definition composite at post-intervention, cognate naming at pre- and post-intervention, and non-cognate naming at pre- and post-intervention. Statistical analyses were conducted in SPSS 25 (IBM Corp., 2017).

3. Results

The first research question asked whether participants showed improvement in the two target areas of vocabulary knowledge and cognate facilitation in the language of intervention, Spanish. Overall, children showed improvement in vocabulary knowledge, as measured by definition quality. As shown in Table 3, SK improved from pre- to post-intervention (mean of positive ranks = 5.94, mean of negative ranks = 1.50, p = .006); CA improved from pre- to post-intervention (mean of positive ranks = 7.00, mean of negative ranks = 2.00, p = .025); and composite scores improved from pre- to post-intervention (mean of positive ranks = 5.89, mean of negative ranks = 2.00, p = .006, see Fig. 1). Individually, 5 of 6 TD children and 4 of 6 children with DLD showed increases from pre- to post-intervention on composite scores, with an average gain of 20 points for the TD children and 16 points for the children with DLD.

The second area of intervention was cognate facilitation. Based on the cognate facilitation task in Spanish (Sheng et al., 2016), cognate naming increased in accuracy from pre- to post-intervention (mean of positive ranks = 5.00, mean of negative ranks = 0.00, p = .004, see Fig. 1). Accuracy of non-cognate naming also increased from pre- to post-intervention (mean of positive ranks = 3.50, mean of negative ranks = 0.00, p = .031). When comparing improvement (i.e., post- minus pre-intervention) on each type of naming, children made more improvement in naming cognates than non-cognates, a pattern that approached statistical significance (p = .051). The average gain for cognate naming was 9%, while the average gain for non-cognate naming was 4%. At the individual level, 5 of 6 TD children and 4 of 6 children with DLD showed improvement in cognate naming, with an average gain of 9% for the TD

Table 3
Pre- and Post-Intervention Measures in Spanish and English.

Language	TD		DLD		Total		
Measure	M	SD	M	SD	M	SD	p value
Spanish							
SK Pre	22	14	10	8	16	13	
SK Post	29	15	18	11	23	14	.006**
CA Pre	16	10	3	1	9	10	
CA Post	26	14	5	7	15	15	.025*
Cog Nam Pre	85	5	64	12	74	14	
Cog Nam Post	92	7	75	13	83	13	.004**
Non-cog Nam Pre	81	14	45	20	63	25	
Non-cog Nam Post	85	11	50	17	67	23	.031*
English							
SK Post	27	8	12	5	19	10	
CA Post	25	9	8	6	17	11	
Cog Nam Pre	93	5	88	6	91	6	
Cog Nam Post	94	7	87	11	90	9	.884
Non-cog Nam Pre	95	6	89	10	92	8	
Non-cog Nam Post	94	5	88	9	91	8	.473

Note. Cognate naming (Cog Nam) and non-cognate naming (Non-cog Nam) are shown as percentages. Definition quality, measured as syntagmatic knowledge (SK) and communicative adequacy (CA), are shown in raw scores. Pre- and post-intervention scores are compared for each variable using Wilcoxon Signed Ranks nonparametric tests and exact p-values, with Benjamini and Hochberg (1995) correction for multiple comparisons. Because the word definition task was not conducted in English before intervention, SK and CA Pre scores in English are not available.

* $p < .05$.

** $p < .01$.

children and 16 % for children with DLD. Additionally, 3 of 6 TD children and 3 of 6 children with DLD showed improvement in non-cognate naming with an average gain of 7% for the TD children and 10 % for children with DLD.

The second research question asked whether improvement in cognate facilitation was related to improvement in definition quality. To address this question, we conducted Spearman's Rank correlations with improvement (i.e., post- minus pre-intervention) in cognate naming, non-cognate naming, and definition quality as measured by composite scores. Results showed that improvement in definition quality was not related to improvement in cognate naming ($r = .12, p = .720$) nor to improvement in non-cognate naming ($r = -.22, p = .494$).

However, visual inspection of the data suggested that associations between variables may be different in each language ability group. Thus, we re-conducted Spearman's Rank correlations for each group separately. For the TD group, there was a significant correlation between improvement in definition quality and improvement in cognate naming ($r = .82, p = .046$). This relation was specific to cognate naming as the correlation between improvement in definition quality and improvement in non-cognate naming was not significant ($r = -.03, p = .954$). For the DLD group, improvement in definition quality was not related to improvement in cognate naming ($r = -.44, p = .381$) nor to improvement in non-cognate naming ($r = -.46, p = .355$). The presence (or absence) of correlations was also reflected in individual child performance: 5 of 6 TD children showed improvement in definition quality and cognate naming, whereas only 2 of 6 children with DLD showed improvement in both areas.

The third research question examined whether skills taught in Spanish (L1) could transfer to the untaught language, English (L2). Since English definition quality was completed at post-intervention only, no pre- to post-intervention comparison could be made for this task. To address this question, we first examined change from pre- to post-intervention in English on the target area of cognate
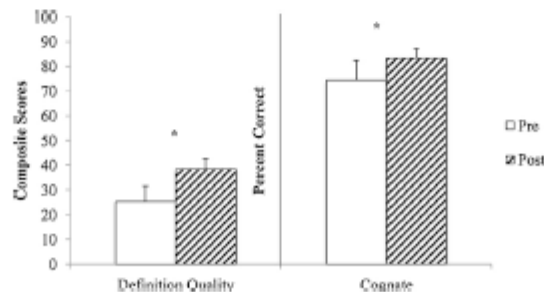

Fig. 1. Definition quality composite scores (i.e., the sum of syntagmatic knowledge and communicative adequacy) and percent correct on cognate naming from the cognate facilitation task at pre and post-intervention are displayed with their corresponding standard error bars. Based on a Wilcoxon Signed-Rank test, both definition quality and cognate naming increased from pre-intervention to post-intervention ($p = .006$ and $p = .004$, respectively).

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facilitation. There was no change in performance on this task from pre- to post-intervention for cognate naming ($p = .884$) or for non-cognate naming ($p = .473$). Children performed at near ceiling levels on this task in English (see Table 3), which may have contributed to the absence of change over time.

To assess whether performance in Spanish and English were related, we conducted Spearman's Rank correlations between Spanish and English measures of vocabulary knowledge (at post-intervention) and cognate naming. As shown in Table 4, definition quality was highly related across languages at post-intervention ($r = .67, p = .017$). Cognate facilitation was also related across languages at post-intervention, shown by a significant correlation in cognate naming ($r = .61, p = .033$) but not in non-cognate naming ($r = .19, p = .552$).

Table 4

Correlations between Spanish and English Measures of Vocabulary Knowledge and Cognate Naming.

		Cognate Pre	Cognate Post	Spanish Non-Cog Pre	Non-Cog Post	Def Post
English	Cognate Pre	.50	.45	.48	.43	.43
	Cognate Post	.25	.61*	.18	.16	.33
	Non-Cog Pre	.29	.20	.11	.14	.04
	Non-Cog Post	.48	.39	.22	.19	.39
	Def Post	.70*	.89**	.67*	.69*	.67*

Note. Spearman's Rank correlations are displayed. Correlations of the same measures in both languages are in bold. Correlations marked with an asterisk continue to be significant after controlling for multiple comparisons (Benjamini & Hochberg, 1995). Cog Nam = Cognate naming; Def = Definition quality, namely the sum of syntagmatic knowledge and communicative adequacy. Pre = Pre-intervention; Post = Post-intervention.

* $p < .05$.
** $p < .01$.

4. Discussion

The overall goal of this intervention was to support vocabulary development in bilingual children with and without DLD. Previous studies have shown that bilingual approaches to language intervention are just as effective as L2-only approaches in promoting gains in the L2, and have the added benefit of promoting gains in the L1 (for reviews, see Ebert & Kohnert, 2016; Kay-Raining Bird et al., 2016; Lim et al., 2019). This study contributes to the treatment literature by examining the effectiveness of an L1-focused intervention for bilingual children.

Our first research question evaluated intervention gains. Overall, children showed improvement in the two target areas of vocabulary knowledge and cognate facilitation in Spanish, the language of intervention (Table 3). Interestingly, relative gains in each target area varied by language ability status. On average, the TD group showed a greater amount of improvement in vocabulary knowledge than the DLD group. Children with DLD have difficulties with word learning (Kan & Windsor, 2010), and as anticipated, the DLD group in this study showed smaller vocabulary gains following intervention when compared to their TD peers.

In contrast, average gains in the second target area, cognate facilitation, favored the DLD group. Relatively larger gains on cognate facilitation for the DLD group may have been partly related to a lower starting point at pre-intervention. However, improvement on cognate facilitation can also reflect the benefit of explicit instruction on cognates and related word learning strategies. The emerging literature on cognate performance in children with language disorders suggests that bilingual children with DLD perform better on cognate naming than non-cognate naming (Grasso et al., 2018). The present study replicates previous findings and extends the literature from assessment to treatment. Findings suggest that bilingual children with DLD are responsive to intervention that aims to improve cognate facilitation.

Overall, intervention gains found in both TD and DLD groups within a relatively short time period demonstrate that bilingual children – even children with DLD – continue to learn in their L1 when provided with systematic support. Strengthening the L1 can have a positive impact on children's long-term developmental outcomes including strengthening family ties and ethnic identity (e.g., Phinney et al., 2001; Tseng & Fuligni, 2000). Academically, bilingual children with high L1 proficiency are better able to capitalize on cross-language similarities in vocabulary acquisition (e.g., Pham, Donovan, et al., 2018). Moreover, incorporating children's L1 promotes an inclusive educational environment in which the knowledge of two languages is viewed as an asset rather than a detriment (Cummins, 2005).

Our second research question asked whether change in cognate facilitation was related to change in vocabulary knowledge. The TD children showed a positive correlation between these two change variables, whereas the DLD group did not. The TD children showed improvement in both definition quality and cognate facilitation in the treated language, Spanish, as well as a strong association between the two skills. The lack of a correlation in the DLD group may have been due to uneven gains across the two target areas of intervention. As discussed previously, the DLD group on average showed relatively larger gains in cognate facilitation than in vocabulary knowledge. Children with DLD may require more time in intervention to learn new words as well as demonstrate their knowledge on a measure of vocabulary depth, namely definition quality. Though tentative in nature, initial results from the TD group provide some support for the use of teaching cognate facilitation as a strategy to learn new words. Cognate facilitation strategies that highlight cross-language similarities can provide an additional way to access and retain word meaning (for intervention activities, see Appendix A and Supplemental Materials).

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The third research question focused on improvement in the untaught language, English, and correlations between Spanish and English performance. Because English definition quality was not measured prior to intervention, pre-to-post change could not be calculated in the area of vocabulary knowledge. For cognate facilitation, children did not show improvement from pre- to post-intervention in English. However, no change in this area is due to near ceiling level performance on this task. Prior to intervention, children's accuracy was above 90 % for cognates and non-cognates, and accuracy remained high following intervention (Table 3). The cognate task was originally designed for younger children (Sheng et al., 2016); future studies with early school-age children may benefit from an increased number of cognate and non-cognate items.

In terms of correspondences between Spanish and English, it was noted that average raw scores for SK and CA at post-intervention were comparable in English and Spanish (Table 3), suggesting similar levels of performance on this task across languages. Additionally, there were strong positive associations between Spanish and English on post-intervention measures of cognate naming ($r = .61$) and definition quality ($r = .67$: see Table 4). The presence of strong cross-language associations suggests a high level of correspondence between languages. Consistent with previous studies (e.g., Ordóñez et al., 2002), Spanish and English vocabulary knowledge was highly associated on measures of vocabulary depth, reflecting rich semantic representations that span two languages.

4.1. Study limitations

There were several limitations to the study. First, the small sample size impacted our statistical power, namely our ability to detect pre- to post-intervention change and to conduct separate analyses for TD and DLD groups. It was notable, however, that despite the small sample size, we found improvement following intervention in vocabulary knowledge and cognate facilitation in Spanish as well as instances of associations between Spanish and English. Additionally, factors such as mother's education level may have influenced study outcomes (e.g., Hoff, 2003). We report mother's education level here to provide a full description of participant characteristics. However, we could not statistically control for this factor given the sample size. We also acknowledge the role of schooling in these results in that all but one participant attended biliteracy programs in their schools. Although this intervention was conducted in the summer when children were on vacation, their prior academic experience may have also contributed to their success in intervention.

In another limitation, the degree of transfer to English (the third research question) could not be fully evaluated in this study due to missing data. Because definition quality was collected in English solely at post-intervention, we could not make pre-to-post intervention comparisons in the area of English vocabulary knowledge. In the second target area, cognate facilitation, children performed at ceiling on the English task, thus limiting our ability to capture change using this measure. Finally, though we found a positive association between Spanish and English definition quality at post-intervention, this finding cannot be directly related to the intervention itself due to the absence of pre-intervention measurement.

Regarding the intervention procedures employed, we did not control for prior exposure to the storybooks that were used in intervention. However, we note the use of story scripts and intervention scripts to control the total number of exposures for each target word (see Appendix A). Finally, our intervention, though intensive (3 days per week, 70 min per day), was relatively short in duration (4 weeks). A longer intervention program could provide more exposure and practice with the target words. Children with DLD may have benefited from more time in intervention to learn new words and to apply their cognate facilitation skills to their overall vocabulary development.

4.2. Concluding remarks

Findings from this study contribute to the empirical literature on language treatment for bilingual children with DLD. The intervention implemented here addresses the question of whether L1-focused intervention can promote vocabulary learning and cognate facilitation in bilingual children, particularly children with DLD. Findings show that bilingual children with and without DLD show improvement in vocabulary knowledge following systematic intervention in the L1. Capitalizing on language similarities, such as targeting cognate facilitation in intervention, is one way to support children's L1 and potentially support vocabulary development across languages. Depth of vocabulary knowledge, measured here by definition quality, is strongly associated between languages. Opportunities to listen and practice new words in meaningful and repeated contexts can deepen vocabulary knowledge in children's L1 and L2.

While intervention in this study was delivered in dyads, the activities and procedures could readily be scaled up for classroom-level instruction or incorporated into center-based approaches to learning. The assessment and teaching of cognates have been employed more regularly in older elementary grades with the emphasis on orthographic similarities (e.g., Malabonga et al., 2008). Results here indicate that teaching cognates in terms of orthographic as well as phonological overlap may also be useful for younger children.

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CRediT authorship contribution statement

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Appendix A

Table A1

Table A1
Intervention Activities, Descriptions, and Dosage.

Activity	Description	Day 1	Day 2	Day 3	Dose
Introduction	The clinician introduces the goal, explains how the goal can relate to children's lives, and reviews the plan for the session.	X	X	X	0
Target Words	a. The clinician reviews the target words and their parts of speech.	X	X	X	2
	b. Using pre-made cards, children are given a definition card and match it with the correct target word card from a choice of 4.			X	2
Book Activity	a. The clinician reads the story script and emphasizes the target words. Story script has five occurrences of each target word. For the first occurrence, children raise their hand when they hear a target word; the clinician says the word, its definition, and repeats the sentence in the story. For the remaining occurrences, the clinician emphasizes the target words while reading the script.	X	X		7
	b. Similar to part (a) except children are asked to provide a definition at the first occurrence of each target word.			X	7
Break Time	Children take a break and eats snacks.	X	X	X	0
Cognate Teaching	a. The clinician explains the concept of cognates using examples and pictures. Using an iPad game, children identify whether pictured objects are cognates between Spanish and English.	X			0
	b. The clinician writes words in Spanish and in English on the white board. Children identify spelling similarities between the Spanish word and its English equivalent by circling the letters that appear in both.		X		0−1
	c. Using a game board with pre-made cards of cognates and non-cognates in Spanish and English, children identify whether a word is a cognate. The clinician agrees or corrects the response with the definition of cognates. Children move from start to finish on the game board following each response.			X	1
Matching	a. Using pre-made cards, children are given a target word card and are asked to match it with the correct definition card from a choice of 2.	X	X		1
	b. Using pre-made cards, children are given a definition card and are asked to match it with the correct target word card from a choice of 4.	X	X		1
Creating Sentences	a. When provided with a target word and its definition, children take turns creating sentences with the target word.	X			0−2
	b. In a fill in the blank format, children identify the word from a choice of 2 that best fits the sentence.			X	2
Story Retell	Children take turns to retell the main events in the story using a storybook App on the iPad that allows for video and audio recording. Children are encouraged to re-listen to their stories.		X		2
Ending	The clinician ends the session by summarizing the goal, what the children have learned, and the plan for the next session.	X	X	X	0
Total dosage across 3 days					38−41

Note. Day 1–3 activities are completed for each storybook. Dose is the number of exposures for each target word within one day per activity. Dose frequency is the number of days in which an activity was repeated, indicated here as an X in the columns: Day 1, Day 2, and Day 3. Total dosage is calculated by multiplying dose * dose frequency and then summing across activities.

Appendix B

Table B1

Table B1
Target Words and Definitions.

Book / Word	English translation	COSP	Freq	Definition
Panqueques para el Desayuno (DePaola, Fusco, & Noren, 1978)				
Determinado	Determined	7	5.74	Cuando quieres hacer algo hasta el fin.
Problema	Problem	6	6.15	Algo difícil que tienes que arreglar.
Compañero	Companion	6	5.47	Un amigo que pasa tiempo contigo.
Preparar	Prepare	6	5.69	Hacer que algo esté listo.
Juntar	Gather	2	5.88	Poner cosas en un grupo.
Vecino	Neighbor	1	5.34	Alguien que vive cerca de ti.
Ganas	Craving	1	5.21	Una comida que tienes que comer ahorita.
Colocar	To Place	1	5.42	Estar puesto en un cierto lugar.
La Gallinita Roja y los Granos de Trigo (Silver, 2005)				
Compañía	Company	8	5.49	Tener presente a otras personas.
Granos	Grains	7	4.71	Las semillas chiquitas que son para plantar.
Paciente	Patient	7	5.45	Cuando esperas algo y no te quejas.
Transportar	Transport	7	5.37	Mover de un lugar a otro.
Evitar	Avoid	2	5.69	Cuando te pones lejos de algo o alguien.
Gritar	Holler	2	5.25	Hablar muy fuerte.
Harina	Flour	0	4.56	Polvo que se usa para hacer pan.
Molestia	Nuisance	0	5.27	Una persona o cosa que te fastidia.
Si Le Das una Galletita a un Ratón (Numeroff, 1995)				
Solo	Solo	8	6.03	No tener alguien a lado.
Natural	Natural	7	5.92	No estar arreglado por humanos.
Tolerar	Tolerate	7	4.93	Estar más o menos bien con algo.
Atención	Attention	6	5.92	Cuando te hace caso.
Dibujo	Drawing	4	5.11	Arte hecho con crayola o lápiz.
Pedir	Request	2	5.56	Decir que quieres algo.
Consejo	Advice	1	5.57	Cuando dices algo y quieres que te lo escuchen.
Alegre	Joyful	1	5.44	Cuando te sientes muy feliz.
Julio el Rey de la Casa (Henkes & Hamilton, 1990)				
Glorificación	Glorification	8	4.12	Dar mucho cariño a alguien.
Consecuencia	Consequence	7	5.51	Lo que te pasa a ti cuando haces algo malo.
Delicado	Delicate	7	4.73	Parecer que se puede quebrar.
Proclamar	Proclaim	7	4.76	Decir algo con mucha emoción.
Contestar	To answer	2	5.01	Dar una respuesta.
Asqueroso	Disgusting	1	4.06	Algo feo que te hace sentir muy mal.
Gerente	Manager	0	4.77	Una persona que manda a otros.
Amenaza	Threat	0	5.35	Algo que puede ser malo para ti.

Note. Words are listed by storybook, cognate status, and word class. COSP = Crosslinguistic Overlap Scale for Phonology (Kohnert et al., 2004). Word frequencies (Freq) are based on a Spanish language corpora (Moreno-Sandoval et al., 2005), reported as the logarithmic value to the base of 10 (Log 10). Definitions were selected from online dictionaries and modified by the research team to be appropriate for young children.

Appendix C. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.jcomdis.2020.106004.

References

August, D., Carlo, M., Dressler, C., & Snow, C. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities Research and Practice, 20*(1), 50–57.

Bankston, C. L., & Zhou, M. (1995). Effects of minority-language literacy on the academic achievement of Vietnamese youths in New Orleans. *Sociology of Education, 68*(1), 1–17.

Beck, I. L., McKeown, M. G., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction.* Guilford Press.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society Series B, 57*(1), 289–300.

Bishop, D. V., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & Catalise-2 Consortium (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry, 58*(10), 1068–1080.

Brownell, R. (2000a). *Expressive one-word picture vocabulary test- Spanish-bilingual edition.* Novato, CA: Academic Therapy Publications.

Brownell, R. (2000b). *Receptive one-word picture vocabulary test- Spanish-bilingual edition.* Novato, CA: Academic Therapy Publications.

Cummins, J. (2005). A proposal for action: Strategies for recognizing heritage language competence as a learning resource within the mainstream classroom. *Modern*

Language Journal, 89(4), 585–592.

DePaola, T., Fusco, E., & Noren, C. (1978). Pancakes for breakfast. Harcourt Brace Jovanovich.

Ebert, K. D., & Kohnert, K. (2016). Language learning impairment in sequential bilingual children. Language Teaching, 49(3), 301–338.

Ebert, K. D., & Pham, G. (2017). Synthesizing information from language samples and standardized tests in school-age bilingual assessment. Language, Speech, and Hearing Services in Schools, 48, 42–55.

Ebert, K. D., Pham, G., & Kohnert, K. (2014). Lexical profiles of bilingual children with primary language impairment. Bilingualism: Language and Cognition, 17(4), 766–783.

Grasso, S. M., Peña, E. D., Bedore, L. M., Hixon, J. G., & Griffin, Z. M. (2018). Cross-linguistic cognate production in Spanish–english bilingual children with and without specific language impairment. Journal of Speech Language and Hearing Research, 61(3), 619–633.

Henkes, K., & Hamilton, L. (1990). Julius, the baby of the world. New York: Greenwillow Books.

Hickman, P., Pollard-Durodola, S., & Vaughn, S. (2004). Storybook reading: Improving vocabulary and comprehension for English-language learners. The Reading Teacher, 57(8), 720–731.

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. Child Development, 74(5), 1368–1378.

IBM Corp (2017). SPSS statistics for windows, version 25.0. Armonk, NY: IBM Corp.

Kan, P. F., & Windsor, J. (2010). Word learning in children with primary language impairment: A meta-analysis. Journal of Speech Language and Hearing Research, 53(3), 739–756.

Kay-Raining Bird, E., Genesee, F., & Verhoeven, L. (2016). Bilingualism in children with developmental disorders: A narrative review. Journal of Communication Disorders, 63, 1–14.

Kelley, A., & Kohnert, K. (2012). Is there a cognate advantage for typically developing Spanish-speaking english-language learners? Language, Speech, and Hearing Services in Schools.

Kohnert, K. (2010). Bilingual children with primary language impairment: Issues, evidence and implications for clinical actions. Journal of Communication Disorders, 43(6), 456–473.

Kohnert, K., Windsor, J., & Miller, R. (2004). Crossing borders: Recognition of Spanish words by English-speaking children with and without language impairment. Applied Psycholinguistics, 25(4), 543–564.

Lidz, C. S. (1991). MLE components and their roots in theory and research. Mediated learning experience (MLE): Theoretical, psychosocial and learning implications271–291.

Lim, N., O'Reilly, M. F., Sigafoos, J., Ledbetter-Cho, K., & Lancioni, G. E. (2019). Should heritage languages be incorporated into interventions for bilingual individuals with neurodevelopmental disorders? A systematic review. Journal of Autism and Developmental Disorders, 49(3), 887–912.

Malabonga, V., Kenyon, D. M., Carlo, M., August, D., & Louguit, M. (2008). Development of a cognate awareness measure for Spanish-speaking english language learners. Language Testing, 25(4), 495–519.

Miller, J. F., & Iglesias, A. (2008). Systematic Analysis of Language Transcripts (SALT), English & Spanish (Version 9) [Computer software]. Madison: University of Wisconsin—Madison, Waisman Center. Language Analysis Laboratory.

Moreno-Sandoval, A., De la Madrid, G., Alcántara, M., Gonzalez, A., Guirao, J. M., & De la Torre, R. (2005). The Spanish corpus. CORAL-ROM: Integrated reference corpora for spoken romance languages. Amsterdam: John Benjamins Publishing Company135–161.

Mulvaney-Day, N. E., Alegria, M., & Sribney, W. (2007). Social cohesion, social support, and health among Latinos in the United States. Social Science & Medicine, 64(2), 477–495.

Numeroff, L. J. (1995). If You Give a Mouse a Cookie (Spanish edition): Si le das una galletita a un ratón. Harper Collins.

Otswang, L. B., Svensson, L., Coggins, T. E., Beilinson, J. S., & Donaldson, A. L. (2006). Reliability issues and solutions for coding social communication performance in classroom settings. Journal of Speech Language and Hearing Research.

Ordóñez, C. L., Carlo, M. S., Snow, C. E., & McLaughlin, B. (2002). Depth and breadth of vocabulary in two languages: Which vocabulary skills transfer? Journal of Educational Psychology, 94(4), 719.

Park, H., Tsai, K. M., Liu, L. L., & Lau, A. S. (2012). Transactional associations between supportive family climate and young children's heritage language proficiency in immigrant families. International Journal of Behavioral Development, 36(3), 226–236.

Pearson, B. Z. (2007). Social factors in childhood bilingualism in the United States. Applied Psycholinguistics, 28(3), 399–410.

Peña, E. D., Gutiérrez-Clellen, V. F., Iglesias, A., Goldstein, B., & Bedore, L. M. (2018). Bilingual English Spanish Assessment (BESA). Brookes.

Pham, H., Guan, M., Zoph, B., Le, Q., & Dean, J. (2018). Efficient Neural Architecture Search via Parameters Sharing. Proceedings of the 35th International Conference on Machine Learning, in PMLR, 80, 4095–4104.

Pham, G., Donovan, D., Dam, Q., & Contant, A. (2018). Learning words and definitions in two languages: What promotes cross-language transfer? Language Learning, 68(1), 206–233.

Phinney, J. S., Romero, I., Nava, M., & Huang, D. (2001). The role of language, parents, and peers in ethnic identity among adolescents in immigrant families. Journal of Youth and Adolescence, 30(2), 135–153.

Proctor, C. P., Carlo, M., August, D., & Snow, C. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. Journal of Educational Psychology, 97(2), 246.

Restrepo, M. A., Morgan, G. P., & Thompson, M. S. (2013). The efficacy of a vocabulary intervention for dual-language learners with language impairment. Journal of Speech Language and Hearing Research, 56(2), 748–765.

Rolstad, K., Mahoney, K., & Glass, G. V. (2005). The big picture: A meta-analysis of program effectiveness research on English language learners. Educational Policy, 19(4), 572–594.

Semel, E., Wiig, E. H., & Secord, W. A. (2003). Clinical evaluation of language fundamentals (4th ed.). San Antonio, TX: PsychCorp [CELF 4 Spanish].

Sheng, L., Lam, B. P. W., Cruz, D., & Fulton, A. (2016). A robust demonstration of the cognate facilitation effect in first-language and second-language naming. Journal of Experimental Child Psychology, 141, 229–238.

Siegel, J., & Castellan, S. (1988). Nonparametric statistics for the behavioral sciences (2nd ed.). New York: McGraw-Hill.

Silver, J. (2005). The little red hen and the grains of wheat. Mantra Lingua.

Storkel, H. L., Komesidou, R., Pezold, M. J., Pitt, A. R., Fleming, K. K., & Romine, R. S. (2019). The impact of dose and dose frequency on word learning by kindergarten children with developmental language disorder during interactive book reading. Language, Speech, and Hearing Services in Schools, 50, 518–539.

Tseng, V., & Fuligni, A. J. (2000). Parent-Adolescent language use and relationships among immigrant families with East Asian, Filipino, and Latin American backgrounds. Journal of Marriage and the Family, 62(2), 465–476.

Valentino, R. A., & Reardon, S. F. (2015). Effectiveness of four instructional programs designed to serve English learners variation by ethnicity and initial English proficiency. Educational Evaluation and Policy Analysis, 37(4), 612–637.

Wiig, E. H., Semel, E. M., & Secord, W. (2003). CELF 5: Clinical evaluation of language fundamentals. Pearson/PsychCorp.

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GENERAL DISCUSSION

The goal of this dissertation is to improve assessment and intervention for bilingual children by placing emphasis on the first language. Because English is the majority language and typically the language of academic instruction, by default, children will receive continued support in English (L2). Furthermore, most speech-language pathologists (SLPs: about 92%) are monolingual English speakers, and many resort to English-only services for bilingual children (Arias & Friberg, 2017). However, children's first language (L1) is just as important for their development as their L2. Bilingual children often need the L1 to communicate with their family members. Knowledge of the L1 is also tied to their identity (Phinney et al., 2001). There are many benefits for L1 maintenance alongside English development (Bialystok, 2011). SLPs are called upon to use evidence-based practice (EBP) for decision making to provide quality care. They are required to service all individuals according to their communication needs, and this includes the L1. However, due to limited resources, including a shortage of bilingual SLPs, support for the L1 is often overlooked. More efforts are needed to emphasize and guide SLPs to include L1 in assessment and intervention.

Main Findings and Clinical Implications

The studies presented in the dissertation can be utilized under the EBP framework for clinical decision making. Based on the studies, recommendations for providing services in the L1 include conducting language sample analysis, capitalizing on language similarities, and involving caregivers. These recommendations can be incorporated into both assessment and intervention.

Language sample analysis is one way to assess bilingual children in their L1 (and their L2). A language sample can be conducted in any language and in various ways (e.g., story retell

or tell). It can provide a multitude of information about a child's language ability. Chapters 1 and 2 used language samples to examine different aspects of children's abilities. They featured microstructural measures, which focus on sentence-level (e.g., grammaticality, mean length of utterance). These broad measures can also provide specific information. For example, Chapter 1 reported on grammaticality as the proportion of correct utterances as well as specific types of grammatical errors. Additionally, Chapter 2 examined macrostructural measures, which tap into different types of language skills, such as story grammar and comprehension. Together these measures provide rich information about an individual's language abilities.

Language samples can also be utilized to compare features and skills in both the L1 and the L2. For example, Chapter 1 identified patterns of similarities and differences between Vietnamese (L1) and English (L2) in typically developing bilingual children. Examples of frequently produced language-specific patterns were classifier errors in Vietnamese and tense errors in English. Patterns shared across languages were prepositional phrase errors and verb omission errors. This information can be used to help with identification of a language disorder when used as a benchmark for typical language abilities. Additionally, this information is also helpful for designing an intervention program for a bilingual child. For example, SLPs can work on language specific errors to increase skills in either the L1 or the L2. On the other hand, patterns that were common between both languages can be targeted to potentially increase skills in both the L1 and the L2. Chapter 1 is an example of how we can identify targets that are common between two distinctly different languages (i.e., Vietnamese and English). Chapter 3 is an example of how we can capitalize on language similarities between two languages that are more similar (i.e., Spanish and English).

Capitalizing on the similarities between the L1 and the L2 in intervention is one way to boost overall language skills. Intervention in the L1 can include a bilingual approach, where we can directly teach about the structural aspects of language shared between both languages. Chapter 3 presented a vocabulary intervention on Spanish-English bilinguals conducted in the L1 (Spanish) capitalizing on the shared feature of cognates, words that share form and meaning between two languages. The children showed gains in both vocabulary knowledge and cognate facilitation (i.e., more accurate performance on cognates than noncognates). This study showed that it is possible for children to 1) learn in their L1 and 2) use what they know about both their languages (i.e., cognates) to learn new words.

Although incorporating L1 into assessment and intervention is important, access to L1 resources and services continue to be a limitation for both clients and clinicians. One way to increase access is by involving caregivers. Involving a caregiver in SLP services can give children access to services in the L1, which may not be obtained with a monolingual English-speaking SLP. In assessment, caregivers can aid in elicitation of a language sample in the L1. Chapter 2 showed that conducting an L1 language sample assessment with the help of a caregiver via telepractice is feasible and socially valid. The children in this study performed similarly whether it was the caregiver or the clinician being the task administrator. Involving caregivers may involve detailed preparation upfront, but will benefit the quality of L1 services. Chapter 2 discussed the level of preparation needed to successfully involve caregivers in assessment, which includes cultural adaptation, detailed instructions, and a highly structured assessment procedure. With this in mind, both bilingual and monolingual SLPs can collaborate with caregivers to effectively assess a bilingual child in their L1.

Future Directions

As a progression to the two assessment studies, the inclusion of a disordered population is needed to further the evidence base on the feasibility and social validity of the assessment procedures for Vietnamese-English bilingual children. Both assessment studies were conducted with typically developing children, contributing to the basis for accurate language assessment. However, the inclusion of a disordered population will help us better understand the areas of weaknesses and need for accurate identification and effective intervention. More information is also needed to understand whether children with language disorders respond to the assessment procedures differently from typically developing children.

Future studies on intervention with bilingual children can further investigate the influence of the L1 on the L2. Learning in the L1 may have the potential to affect positive changes not only in the L1, but also the L2. Furthermore, future studies should also include an L1 that is distinctively different from English, such as Vietnamese, where areas of similarities are not orthographically or phonologically apparent. For example, cognates do not exist for English and Vietnamese. Intervention for Vietnamese-English bilinguals can potentially capitalize on other areas of similarities, such as sentence structure (see cross-language patterns in Chapter 1).

Lastly, future studies can extend the knowledge base on involving caregivers in L1 assessment and intervention with bilingual children. L1 assessment with caregivers can include different types of language sample elicitation methods or other types of assessment tasks. Similarly, L1 intervention can investigate the help of a caregiver for different intervention strategies and using different parent training methods.

As a first step towards future studies involving caregivers and a clinical population, it is important to understand their perspectives on topics such as bilingualism. To this end, I have conducted a mixed methods qualitative interview and quantitative survey study with a group of bilingual caregivers on their perspectives on topics relating to access to SLP services (i.e., telepractice) and bilingualism. In this next section I will present some preliminary data analysis.

Caregivers' Perspective

The purpose of this study is to better understand Vietnamese American caregivers' perspectives on telepractice and bilingualism through qualitative interviews and quantitative survey responses. Using an exploratory sequential mixed methods approach (Fisher & Sanderson, 1993), this study consisted of two phases. In Phase 1, five Vietnamese American caregivers (who have a child with SLP services) were interviewed about their perspectives on telepractice and bilingualism. These interviews were analyzed for themes in order to create a survey that was distributed to over 100 Vietnamese American caregivers (Phase 2). We will first discuss Phase 1 and then Phase 2.

Phase one: Caregiver interviews:

Participants were five Vietnamese-American caregivers, aged 36 to 50 years (M = 43.4, SD = 5.73). There were 3 mothers and 2 fathers. All caregivers were foreign born and have been in the U.S. from 7 to 25 years (M = 22.20, SD = 13.41). The participants' children's ages ranged from 45 to 75 months (M = 57.80, SD = 13.10). There were 3 girls and 2 boys. All the children were born in the US. All the children had a speech and/or language diagnosis and had received remote speech-language services either with assessment (n=1) or intervention (n=4). Telepractice intervention services ranged from 1 month to 2 years; all remote services were during the COVID-19 Pandemic. At the time of the interviews, all children received in-person speech-

language intervention either currently or in the past, either in the home (n=2) or at school (n=3). In-person services ranged from 2 months to 2 years.

The clinician interviewed each caregiver either through Zoom videoconferencing (n = 2) or via a phone call (n = 3) in Vietnamese (n=3) or in English (n=2). The clinician asked the caregiver open-ended questions and gave the caregiver time to reflect and respond. The clinician asked follow-up questions during the interview to clarify a response or obtain further information. The interviews were recorded using an audio recorder or both the Zoom recording function and the audio recorder. Audio recordings were transcribed and analyzed for important themes. These themes were used to create question items for the Phase 2 survey.

Open-ended interview questions were created to better understand Vietnamese caregivers' perspectives on telepractice. These questions asked about their experience with telepractice and in-person speech-language services and their opinion on bilingualism. A thematic analysis based on Braun and Clarke (2006) was conducted on the open-ended interview responses. The responses were first read and reviewed multiple times in order to develop initial codes, which were derived directly from the responses with minimal interpretation. The codes were then organized into themes and subthemes and organized into a thematic map. The themes as well as quotations from the caregivers were used to effectively demonstrate findings.

The thematic analysis resulted in three main themes: Importance of the First Language, Telepractice Benefits, and Telepractice Challenges. For the purpose of this dissertation, we will only focus on the first theme: Importance of the First Language (L1). Most of the caregivers (4/5) expressed that it is important that their child is bilingual, emphasizing the need for L1 maintenance and support.

Caregivers worried less about their children's English language skills. They recognized that their children's English will develop quickly once they enter school. The following are quotations from two separate caregivers: "But English, we believe that as soon as they go to school, they have American friends, they will learn really fast (Caregiver 3, C3)" and "Tiếng Anh thì sau này thì vô trường đều nói tiếng Anh à (C1)." [*English translation*: For English, once they enter school they will speak English].

On the other hand, L1 is the language that is used to communicate at home. Caregivers are more worried that their children may forget or not know how to speak it. One caregiver said: "Tại vì tiếng Cha sinh Mẹ đẻ thì mình đâu thể cho con mình quên được (C1)." [*English translation*: Because we cannot let our children forget their mother tongue]. One consequence to not knowing the L1 is the inability to communicate with family members. One caregiver mentioned how her mother scolded her because her daughter does not speak Vietnamese:

> Mẹ có nói là tại sao mày không cho nó học tiếng Việt…Mai mốt nó đi về Việt Nam rồi tao nói chuyện với nó làm sao? Bà con cô bác nói chuyện với nó làm sao? Đâu ai biết tiếng Mỹ đâu (C4). [*English translation:* My mom said why don't you let her learn Vietnamese…when she goes back to Vietnam, how will I communicate with her? How will her relatives communicate with her? No one knows English].

Caregivers also believe that the L1 is tied to their children's cultural upbringing and personal identity. One caregiver said: "Because you know, her grandparents speak Vietnamese and I want her to know her culture. And I speak it. I want her to know her culture cause that's gonna tie to her identities (C2)."

Caregivers feel that having a bilingual SLP is very important in order to help support the first language. Not only will the SLPs help with L1 support, but caregivers can also be more involved. One caregiver said:

Cái người đó có thể…hiểu được những cái gì mình mong muốn. Người ta giúp mình được nhiều hơn. Giúp mình thì mình có thể giúp lại con mình được (C4). [*English translation*: that person (Vietnamese-English bilingual SLP) will be able to understand my wishes. They can help me better. Helping me so that I can help my daughter].

Bilingual SLPs can also help decrease the language barrier for both the caregivers and the child, which will promote better communication and overall comfort. One caregiver mentioned that her son knew more Vietnamese than English, so his SLP needed to use a translator, however, she said: "But a translator does not have the skills to pick up the articulation word from Vietnamese word…so he [child] got mad, he got really mad (C3)." This caregiver also mentioned that many caregivers in the Vietnamese community will benefit from a Vietnamese-speaking provider, she said:

Some friend that I know in the Vietnamese community, they have their kid in Vietnam, so they brought their kid here. The mom doesn't have chance to go to school and study English so they really don't understand what the process, what my kid doing at school, how the speech therapist help him…for some family they just arrive from Vietnam, it's really important [that the SLP speaks Vietnamese] (C3).

The qualitative interviews gave us an insight on how some Vietnamese American caregivers feel about their children's bilingual development and having access to bilingual services. Having support for the L1 is an important theme among the caregivers. With this information we have included questions related to the importance of communicating in the L1 and bilingual services in the survey for Phase 2.

Phase 2: Caregiver survey:

Participants were 103 caregivers of Vietnamese from different regions of the United States: Northeast (n = 76), West (n = 13), Southwest (n = 10), and Southeast (n = 4). Caregivers included 80 mothers and 23 fathers. Caregivers' ages ranged from 24 to 49 (*M* = 35.85, SD = 4.67). Caregivers had children who were in the three- to six-year-old age range. A subset of this

sample of caregivers (n = 20, 19%) had a child who was currently receiving speech-language services.

A survey with multiple question formats (e.g. rating scales, multiple choice) was created based on the caregivers' responses and common themes found from the interviews in Phase 1. Survey items included questions on demographics, language use and fluency, opinions and experience with telepractice and speech-language services, acculturation questions, and questions on technology use. The survey was completed via Qualtrics, a survey software, to facilitate online administration and data collection. It was disseminated through online platforms to Vietnamese caregivers. Responses to the survey were automatically recorded through Qualtrics and analyzed for group outcomes.

Results showed that nearly all caregivers (n = 100, 97%) indicated some level of importance (slightly to very important) that their child can communicate in Vietnamese (see Figure 4.1). Nearly all the caregivers who have children with SLP services are interested in having a Vietnamese-speaking SLP for their child (18 of 20), even though most caregivers themselves do not have difficulties communicating with the SLP due to language barriers (n = 16, 80%). Further, if needed, most caregivers are interested in telepractice for their children (n = 71, 69%) especially when telepractice services involve bilingual services. This study showed that Vietnamese American caregivers are open to services that increase access to the first language and that they feel it is important for their child to be able to communicate in Vietnamese.
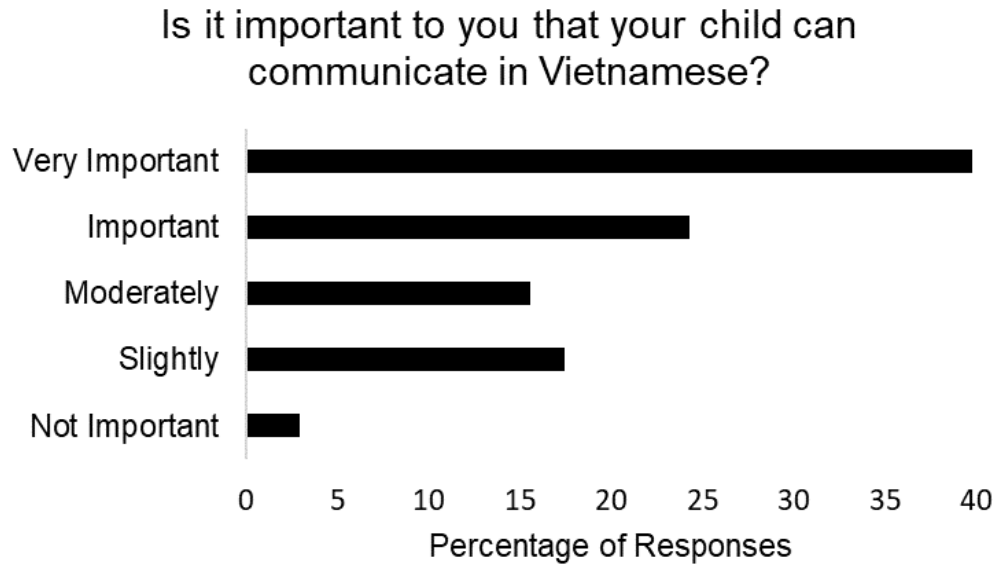
Is it important to you that your child can communicate in Vietnamese?

Figure 4.1 *Survey Question- Importance of communicating in Vietnamese.*

Concluding Remarks

There is a clear mismatch between the numbers of bilingual speech-language pathologists (SLPs) to the number of individuals who need bilingual services. SLPs are called upon to use evidence-based practice (EBP) for clinical decision making in order to provide high quality care. However, SLPs lack the tools and resources to service bilingual children in both languages, especially for the first language (L1). Under the EBP framework, studies in this dissertation lay the foundation for future research on improving assessment and intervention in the L1 for bilingual children. Some recommended procedures include conducting language sample analysis, capitalizing on language similarities, and involving caregivers. More studies are needed to include these recommendations in assessment and/or intervention with different languages and clinical populations. More emphasis is needed to encourage the presence of L1 in bilingual services. Studies that emphasize the L1 in assessment and intervention with bilingual children contributes to improving the quality of care for this population.

REFERENCES
(Abstract, Introduction, & Discussion)

American Speech-Language-Hearing Association (2005). *Evidence-Based Practice In Communication Disorders.* https://www.asha.org/policy/ps2005-00221/

American Speech-Language-Hearing Association. (2021). *Demographic profile of ASHA members providing bilingual services.* https://www.asha.org/siteassets/surveys/ demographic-profile-bilingual-spanish-service-members.pdf

Anderson, R. T. (2012). First language loss in Spanish-speaking children. In *Bilingual language development and disorders in Spanish-English speakers 2* (pp.193-212). Brookes Publishing.

Anderson, R. T., & Márquez, A. (2009). The article paradigm in Spanish-speaking children with SLI in language contact situations. In *Hispanic Child Languages* (pp. 29-56). John Benjamins.

Arias, G., & Friberg, J. (2017). Bilingual language assessment: Contemporary versus recommended practice in American schools. *Language, Speech, and Hearing Services in Schools*, *48*(1), 1-15. https://doi.org/10.1044/2016_LSHSS-15-0090

Bassow, M. (2008). *Focus on solutions to client-clinician mismatch: conversations with speech-language pathologist and parents*.[Master's Thesis, Portland State University]. Research Gate. https://www.researchgate.net/publication/228838553

Bialystok, E. (2011). Reshaping the mind: the benefits of bilingualism. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, *65*(4), 229-235. https://doi.org/10.1037/a0025406

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101. DOI: 10.1191/1478088706qp063oa

Caesar, L. G., & Kohler, P. D. (2007). The state of school-based bilingual assessment: Actual practice versus recommended guidelines. https://doi.org/10.1044/0161-1461(2007/020)

Capps, R., Fix, M., Murray, J., Ost, J., Passel, J. S., & Herwantoro, S. (2005). *The new demography of America's schools: Immigration and the No Child Left Behind Act*. Urban Institute (NJ1). https://eric.ed.gov/?id=ED490924

Dollaghan, C. A. (2007). *The handbook for evidence-based practice in communication disorders*. Paul H Brookes Publishing.

Du, Y., Sheng, L., & Salen, K. (2020). "Try your best": Parent behaviors during administration of an online language assessment tool for bilingual Mandarin-English children. In *IDC'20 proceedings of the ACM interaction design and children conference (virtual)* (pp.409–420). https://doi.org/10.1145/3392063.3394441

Ebert, K. D., & Kohnert, K. (2016). Language learning impairment in sequential bilingual children. *Language Teaching*, *49*(3), 301-338. DOI:10.1017/S0261444816000070

Ebert, K. D., Pham, G., & Kohnert, K. (2014). Lexical profiles of bilingual children with primary language impairment. *Bilingualism: Language and Cognition*, *17*(4), 766-783. https://doi.org/10.1017/S1366728913000825

Fisher, C., & Sanderson, P. (1993). Exploratory sequential data analysis: Traditions, techniques and tools. *ACM SIGCHI Bulletin*, *25*(1), 34-40. https://doi.org/10.1145/157203.157208

Heilmann, J. J., Rojas, R., Iglesias, A., & Miller, J. F. (2016). Clinical impact of wordless picture storybooks on bilingual narrative language production: A comparison of the 'Frog' stories. *International Journal of Language & Communication Disorders*, *51*(3), 339-345. https://doi.org/10.1111/1460-6984.12201

Kay-Raining Bird, E., Genesee, F., & Verhoeven, L. (2016). Bilingualism in children with developmental disorders: A narrative review. *Journal of communication disorders*, *63*, 1-14. https://doi.org/10.1016/j.jcomdis.2016.07.003

Kohnert, K. & Derr, A. (2004). Language intervention with bilingual children. In B.Goldstein (Ed.), *Bilingual language development and disorders in Spanish-English speakers* (pp.311-338). Brookes Publishing.

Kohnert, K., Ebert, K. D., & Pham, G. T. (2020). *Language disorders in bilingual children and adults 3rd edition*. Plural Publishing.

Liang, F. (2018). Parental Perceptions toward and Practices of Heritage Language Maintenance: Focusing on the United States and Canada. *International Journal of Language Studies*, *12*(2), 65-86. https://eric.ed.gov/?id=ED581470

Mulvaney-Day, N. E., Alegria, M., & Sribney, W. (2007). Social cohesion, social support, and health among Latinos in the United States. *Social science & medicine*, *64*(2), 477-495. https://doi.org/10.1016/j.socscimed.2006.08.030

Oetting, J. B. (2018). Prologue: Toward accurate identification of developmental language disorder within linguistically diverse schools. *Language, Speech, and Hearing Services in Schools*, *49*(2), 213-217. https://doi.org/10.1044/2018_LSHSS-CLSLD-17-0156

Paradis, J. (2005). Grammatical morphology in children learning English as a second language. https://doi.org/10.1044/0161-1461(2005/019)

Park, H., Tsai, K. M., Liu, L. L., & Lau, A. S. (2012). Transactional associations between supportive family climate and young children's heritage language proficiency in immigrant families. *International Journal of Behavioral Development*, *36*(3), 226-236. https://doi.org/10.1177/0165025412439842

Pearson, B. Z. (2007). Social factors in childhood bilingualism in the United States. *Applied psycholinguistics*, *28*(3), 399-410. DOI:10.1017/S014271640707021X

Pham, G., Donovan, D., Dam, Q., & Contant, A. (2018). Learning words and definitions in two languages: What promotes cross-language transfer?. *Language learning*, *68*(1), 206-233. https://doi.org/10.1111/lang.12274

Phinney, J. S., Romero, I., Nava, M., & Huang, D. (2001). The role of language, parents, and peers in ethnic identity among adolescents in immigrant families. *Journal of youth and Adolescence*, *30*(2), 135-153. https://doi.org/10.1023/A:1010389607319

Restrepo, M. A., Morgan, G. P., & Thompson, M. S. (2013). The efficacy of a vocabulary intervention for dual-language learners with language impairment. *Journal of Speech, Language, and Hearing Research, 56*(2), 748-765. https://doi.org/10.1044/1092-4388(2012/11-0173)

Sheng, L., Lu, Y., & Kan, P. F. (2011). Lexical development in Mandarin–English bilingual children. *Bilingualism: Language and Cognition*, *14*(4), 579-587. DOI:10.1017/S1366728910000647

Tomblin, J. B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997). Prevalence of specific language impairment in kindergarten children. *Journal of speech, language, and hearing research*, *40*(6), 1245-1260. https://doi.org/10.1044/jslhr.4006.1245

U.S. Census Bureau (2020). *DPO2: Selected Social Characteristics in the United States*. https://data.census.gov/cedsci/table?tid=ACSDP5Y2020.DP02&hidePreview=true

Williams, C. J., & McLeod, S. (2012). Speech-language pathologists' assessment and intervention practices with multilingual children. *International Journal of Speech-Language Pathology*, *14*(3), 292-305. https://doi.org/10.3109/17549507.2011.636071

Young, R., & Tran, M. (1999). Language maintenance and shift among Vietnamese in America. https://doi.org/10.1515/ijsl.1999.140.77