The Dissertation Committee for Connie Lorene Summers certifies that this is the approved version of the following dissertation:

Nonwords and Narratives:

English and Spanish Recall Tasks

in Bilingual Children

Committee:

____

Elizabeth D. Peña, Supervisor

____

Lisa M. Bedore

____

Li Sheng

____

Catherine Echols

____

Thomas Bohman

Nonwords and Narratives:

English and Spanish Recall Tasks

in Bilingual Children

by

Connie Lorene Summers, B.S., M.S.

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Dedication

This dissertation is dedicated to the children and parents with whom I have worked over the past several years in Denver Public Schools, Pflugerville Independent School District, and Hays Consolidated School District. These children inspired me to be a better clinician and a better researcher. This work is also dedicated to my parents, Kelly and Clarissa Summers, who taught me that I was capable of great things and who have never faltered in their love and support.

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Nonwords and Narratives:

English and Spanish Recall Tasks

in Bilingual Children

Connie Lorene Summers, Ph.D.

The University of Texas at Austin, 2010

Supervisor: Elizabeth D. Peña

Both long-term language knowledge and language ability affect the efficiency of the working memory system (Kohnert, Windsor, & Yim, 2006; Summers, Bohman, Peña, Bedore, & Gillam, 2009). Models of working memory (Baddeley, 2003; Cowan, 1999; Potter & Lombardi, 1990) account for variations in how memory is used in nonword repetition (NWR) and narrative retell tasks. Use of working memory varies by language ability and language experience. The current study explored the role of working memory, language ability, and language experience on narrative retell in bilingual children. Eighty bilingual first grade children participated in the study and represented a wide range of language abilities as determined by the Bilingual English Spanish Assessment (Peña, Gutiérrez-Clellen, Iglesias, Goldstein & Bedore, in preparation) and a wide range of language experiences. The participants repeated nonwords (Calderón, 2003; Dollaghan & Campbell, 1998) and retold stories in both English and Spanish. Stories were scored based on the percent of key components (KC) that were recalled based on the model story. Results revealed that Ability predicted narrative retells in both English and Spanish. Current language experience also predicted English and Spanish retells. English NWR predicted narrative retell in English only. NWR did not mediate the effect of language ability or language experience on recalling KCs. Yet, English NWR did predict English KCs. These results support memory models that account for memory tasks using longer units of language (Cowan, 1999; Potter & Lombardi, 1990).

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Chapter 1: Review of the Literature

In order to comprehend language, children attend to linguistic information and construct phonological representations while retaining the initial input to allow comparison with long-term memory. Both long-term language knowledge and language ability affect the efficiency of the working memory system, although much of this work has focused on working memory tasks for short units of information (Kohnert, Windsor, & Yim, 2006; Masoura & Gathercole, 2005; Summers, Bohman, Peña, Bedore, & Gillam, 2009). This study examines the recall performance of children with a range of language experiences and abilities in a memory task using longer chunks of language to help disambiguate how bilingual children use long-term language and working memory. This focus will increase understanding of underlying mechanisms of memory and their relationship with language performance.

Two specific memory tasks that are well documented to vary by ability and language experience are nonword repetition (NWR) and narrative recall. Repeating nonwords and retelling narratives both depend on memory skills but also access language knowledge, although to different degrees. Repeating nonwords relies on long-term knowledge of the phonotactic properties of a language as well as some lexical knowledge particularly if the words are more wordlike (Graf Estes, Evans, & Else-Quest, 2007; Kohnert et al., 2006; Masoura & Gathercole, 2005). While both tasks rely on short and long-term memory, narrative recall places a greater demand on short-term memory abilities because stories are longer than nonwords. Narrative recall also activates long-term language knowledge more than NWR. Recalling narratives relies on the long-term storage of lexical, conceptual, and cultural knowledge of a language (Geist & Aldridge, 2002; Reese, Sparks, & Leyva, 2010).

The Role of Memory in Language Learning

Models of short and long-term memory provide the context for examining and comparing the relationship between NWR and narrative performance in this study. Various models have been used to account for the activation of long-term language knowledge in memory tasks. Baddeley's model of working memory (1996) provides an account of the interaction between short and long-term memory that aides in understanding NWR performance. While providing critical information about how phonological information is stored and accessed, Baddeley's model has not been widely used to account for activation of long-term knowledge in processing longer chunks of language such as narratives. Other memory models have been used to account for memory of larger chunks of language. Cowan's working memory model of embedded-processes is one such model that focuses on the region in which long-term memory is activated (Bunting, Cowan, & Colflesh, 2008). Language based accounts of short-term memory focus on the underlying representations that are activated in the language processing system (Potter & Lombardi, 1990; Rummer & Engelkamp, 2001). These memory models will be explored in terms of NWR and narrative retell.

Baddeley's model of working memory (1996) provides one explanation of how memory is used to process language. As his model pertains to verbal working memory, the phonological loop is controlled by a central executive. Auditory information is held briefly in the phonological loop. The central executive includes components such as attention and inhibition which control what information passes on to the slave components. More recently, Baddeley (2003) adjusted his model to reflect the growing recognition that information entering the working memory system also interacts with previous knowledge and experience, affecting the use of the phonological loop. In this updated model, Baddeley differentiated between fluid memory and crystallized memory. Fluid memory components include the phonological loop and central executive of his original model. In the newer model, crystallized memory components were added to include long-term language knowledge. An episodic buffer also provides storage of longer chunks of language. As auditory information activates long-term storage, it is held in the phonological loop for a longer period of time.

Baddeley's model has been useful in explaining performance on working memory tasks such as nonverbal processing tasks, span tasks, and word and nonword repetition tasks (Gathercole, 2006). However, a weakness of the model is the explanation of how memory is activated in language tasks involving larger chunks. The episodic buffer alone cannot account for such complex memory tasks. Further exploration of more complex language tasks within the framework of Baddeley's model is needed to fully account for the use of long-term memory in processing language. Cowan's working memory model of embedded-processes (1999) has been used to account for memory of larger chunks of language. During activation of working memory in this model, there is a limited-capacity region called the *focus of attention* in which long-term memory is activated. Here, memory storage relies on attention. Specifically, activation from long-term memory of lexical and semantic knowledge that can be held in working memory is mediated through the *focus of attention* (Bunting et al., 2008). Accuracy of performance is decreased when memory load is increased past the point at which information is typically held in working memory (Chen & Cowan, 2009). In the case of narrative recall, lexical and conceptual knowledge could be activated and held in the *focus of attention* for a period of time until needed for retelling.

Language-based accounts of short-term memory also offer further insights into the role of memory in narrative performance. In these accounts, memory is placed within the framework of the language processing system without breaking up the specific types of memory into different components. In these accounts, linguistic items are retained based on underlying representations in the language processing system (Schweppe & Rummer, 2007). Phonological (Rummer & Engelkamp, 2001) and morphosyntactic (Schweppe, Rummer, & Fürstenberg, 2009) representations in short term memory contribute to recall. Evidence for this view comes from data using more linguistically complex recall tasks such as sentence repetition rather than traditional working memory tasks such as digit span or nonword repetition. For example, sentence repetition tasks that use lure words by presenting a synonym before or after the target sentence reduce accuracy of sentence recall but only when the lure word or synonym does not change the meaning of the sentence (Lombardi & Potter, 1992; Potter & Lombardi, 1990). Thus, sentences are recalled not only by surface representation in short-term memory but also by activating lexical and conceptual knowledge in long-term memory and making representations. Applied to narrative recall, lexical and conceptual knowledge might be activated to a greater extent than sentence repetition because of greater linguistic input.

Following the memory models, predications of performance on NWR and narrative retell can be made. For the present study, if NWR predicts narrative retell performance, this would provide evidence that the phonological loop in Baddeley's model (2003) is a key mechanism in recalling key components even within a more linguistically complex context such as narratives. If NWR does not predict narrative retell, than other memory components would account for narrative retell such as the episodic buffer, which has not been sufficiently explained in Baddeley's model. Across these models of memory, working memory is essential in language use and interacts with long term memory. Both working memory and long term memory are moderated by language ability and language experience. Examining such variations can also help disambiguate how working memory interacts with long-term language knowledge.

Variations in language ability. Ability variations in memory can result from two sources; typical cognitive development and individual differences in the memory system. In terms of development, children become more efficient users of their working memory systems as they learn (Gilchrist, Cowan, & Naveh-Benjamin, 2009; Santos, Bueno, & Gathercole, 2006). Long-term language knowledge also increases as a byproduct of development as children are exposed to more complexities in language. The relationship between NWR and other language domains reflects changing relationships in development and language learning. Verbal memory skills appear to drive vocabulary growth in younger children and are reflected in higher correlations between NWR and vocabulary while correlations are weaker in older children (Adams & Gathercole, 1995; Gathercole, 2006; Gathercole, Willis, & Emslie, 1992; Jarrold, Baddeley, Hewes, Leeke,

& Phillips, 2004; Roy & Chiat, 2004). Similar patterns of associations between NWR and semantic knowledge have been documented across languages including English (Gathercole & Baddeley, 1990), Spanish (Girbau & Schwartz, 2007); Cantonese (Stokes, Wong, Fletcher, & Leonard, 2006); Greek (Masoura & Gathercole, 1999); and Swedish (Reuterskiöld-Wagner, Sahlén, & Nyman, 2005).

Individual differences in working memory systems are also related to variations in language abilities. Children and adults with lower language abilities perform more poorly on working memory tasks than children with higher language abilities (Gillam, Cowan, & Marler, 1998; Graf Estes et al., 2007; Isaki, Spaulding, & Plante, 2008; Kohnert & Windsor, 2004). Researchers have posited several explanations regarding the nature of these individual differences. One perspective is that these differences may be the result of a specific limited capacity in specific components of the memory system such as phonological working memory (Coady, Evans, & Kluender, 2009; Gathercole & Baddeley, 1990) or a limited capacity in their entire memory system (Ellis Weismer, Evans, & Hesketh, 1999; Isaki et al., 2008). Differences may also be reflective of a trade-off between processing and storage (Daneman & Carpenter, 1980). In this trade-offs view, children with lower language abilities may be inefficient processors and have higher storage demands needed to perform language functions. Further deficits could ensue as children may not have developed a rich long-term language store as a result of language learning difficulties when compared to children with higher language abilities.

In the current study, significant interactions between ability and NWR in predicting narrative retell would confirm previous findings (Summers, Bedore, Peña, &

Gillam, 2009). Such a finding would suggest that children with lower language abilities relay more on their phonological loop to recall elements of narratives than children with higher abilities. If no interactions were found, children would be using their working memory systems similarly across ability levels. Differences in retell performance would be better explained by overall development and not attributed to a specific stage of language learning. If the influence of ability is not mediated by NWR, narrative retell performance would be better accounted for by memory models that adequately explain memory of longer chunks of language (Bunting et al., 2008; Potter & Lombardi, 1990).

Variations in language experience. A second source of individual variation in working memory comes from language experience. General language experience increases long-term language knowledge much as typical development does. Additionally, variations in language experience resulting from exposure to more than one language influence the language knowledge and use of working memory (Gutiérrez-Clellen, Calderón, & Ellis Weismer, 2004; Masoura & Gathercole, 2005; Schweppe & Rummer, 2007; Summers, et al., 2009; Vitevitch & Luce, 1998). NWR tasks provide evidence of for the role of language experience on the working memory system. For example, activation of long-term language knowledge is dependent on the word-likeness of the nonwords and phonotactic probability. Words that are more wordlike such as "glistering" (Gathercole & Baddeley, 1996) are recalled more easily than less wordlike nonwords such as "tingkua" (Dollaghan & Campbell, 1998). One explanation for these differences is that more wordlike nonwords activate long term language knowledge. Similarly, words with high phonotactic probability are more likely to activate long-term knowledge and therefore, easier to remember and repeat more accurately and quickly than nonwords with low phonotactic probability (Frisch, Large, & Pisoni, 2000; Merriman & Marazita, 1995; Vitevitch & Luce, 1998). This finding extends to second language learners who consistently repeat nonwords reflecting the phonotactic properties of their stronger language more accurately than nonwords from their weaker language (Masoura & Gathercole, 2005; Thorn & Gathercole, 2001).

Influences of language knowledge can extend to both languages of a bilingual. For example, Summers, et al. (2009) found that the more experience bilinguals had with a multisyllabic language, the better they are at repeating longer nonwords in both of their languages. In their study of NWR in English/Spanish bilinguals, children with more cumulative experience with Spanish (meaning they were first exposed to English later) were more accurate repeating nonwords in both English and Spanish regardless of their age or their current input and output in English and Spanish. Greater experience with Spanish reflected greater experience with multisyllabic words.

While language knowledge influences processing in both languages, children's language processing systems are not as efficient in the early stages of language learning perhaps because language knowledge is lower than in later years of development. Children learning two languages have higher correlations between nonwords and vocabulary in their second language than for their native language (French & O'Brien, 2008; Masoura & Gathercole, 2005). Children in an earlier stage of language learning may be using their working memory skills to learn vocabulary more than they do in their first language.

Variations in performance due to proficiency and language experience have been explained in terms of a *frequency effect* (Michael & Gollan, 2005). In this case, frequency is the amount of experience one has with a language. This frequency effect is exhibited by divided input and practice between two languages, which decreases the amount of language experience for each language compared to monolinguals. Frequency effects can be seen by increased Tip-of-the-Tongue states (TOT) in bilingual adults (Gollan & Acenas, 2004; Gollan & Brown, 2006; Pyers, Gollan, & Emmorey, 2009). Less experience in both languages of a bilingual leads to less experience with phonological structure, grammatical forms, lexical and conceptual knowledge, and narrative structure of their languages. Consistent with the *frequency effect*, bilingual children's performance could be influenced based on their amount of exposure to each language.

Language experience in terms of memory models allows for various predictions. For the current study, it was expected that for children with more current and cumulative experience with Spanish, English NWR would be more predictive of English narrative retell and Spanish NWR would be less predictive of Spanish narrative retell. The opposite pattern would be apparent in children with more experience in English. Such an interaction of language experience and NWR would indicate that different stages of language growth rely on the phonological loop differently. Children at an earlier stage of language learning would rely more on phonological working memory to mediate language tasks (French & O'Brien, 2008; Masoura & Gathercole, 2005). Conversely, children at later states of language learning would rely less on the phonological loop and more on long-term language knowledge for such tasks providing support for Baddeley's model of working memory (2003). But, if no interaction between NWR and experience were found, it would appear that the phonological loop is less affected by language experience than previously presumed. The variation in the language experiences of bilinguals provides a unique context in which to examine the relationships of language experience and ability with working memory. Tasks with a memory component can allow for the examination of these relationships in bilinguals.

Memory Tasks in Bilinguals

Tasks using a recall paradigm provide opportunities to examine the influence of memory on language. Both NWR and narrative retell use a recall paradigm and rely on memory although they differ in their demand on long-term memory. In NWR, children may access their phonotactic knowledge of a language, but are less likely to activate cultural and episodic knowledge because NWR is more decontextualized than many of the traditional language measures commonly used to assess language learning abilities. NWR tasks rely heavily on short-term memory. In contrast to the decontextualized nature of NWR, narrative retells are highly contextualized relying more heavily on language experience than NWR including conceptual, cultural and episodic knowledge. High frequency words of a language, words that are repeated several times during a story, and stories that include familiar events might facilitate narrative retell in much the same way as high wordlike nonwords facilitate the repeating of nonwords. Since phonotactic and narrative structure is different for each language, bilinguals provide an appropriate context in which to examine ability and experience variations in recall tasks.

NWR in bilinguals. Bilinguals vary in their accuracy repeating nonwords based on their language abilities and language experiences just as monolinguals do. Evidence comes from recent work with bilingual children. In a study by Summers, Peña, Bedore, Gillam and Bohman (2008), typically developing bilingual children performed slightly higher in Spanish than in English, while the bilingual children with low language abilities performed significantly higher in English than in Spanish even though both groups were similar in their average ranges of input and output in Spanish and English. The children with typical language abilities may have developed a stronger foundation in their first language, Spanish. It is likely that their learning (or language uptake) was more efficient and they were able to take advantage of all their previous experience with Spanish. In contrast, children with lower language abilities were not efficient processors and did not benefit to the same extent as the children with typical language abilities from their previous experiences with Spanish. These findings were consistent with Gutiérrez-Clellan and Simon-Cereijido (2010) who found that children with language impairment performed significantly lower in both English NWR and Spanish NWR than their typically developing peers.

NWR performance also varies by experience with different languages. When both English and Spanish nonwords have been used with bilingual children, participants have been more accurate repeating Spanish nonwords overall regardless of level of exposure to English and Spanish (Gutiérrez-Clellen & Simon-Cereijido, 2010; Summers, Bohman et al., 2009). These findings are consistent with other studies that used nonwords from multisyllabic languages and found children are highly accurate repeating longer nonwords when they are based on languages that are multisyllabic (Girbau & Schwartz, 2007; Masoura & Gathercole, 1999; Santos & Bueno, 2003). These different patterns of performance as related to the phonological characteristics of the language additionally highlight the need for using nonwords in both languages (Kohnert et al., 2006).

Narratives in bilinguals. Narrative performance in bilingual children varies by language experience, more so than for NWR. As children's dominance shifts, usually with age and schooling, they recall stories better in the language in which they are dominant (Gutiérrez-Clellen, 2002). Bilingual children do not exhibit the same patterns of performance in stories across languages (Fiestas & Peña, 2004; Simon-Cereijido & Gutiérrez-Clellen, 2009). Performance varies by language experience in the narratives of bilingual children. Bilingual children use a greater variety of verbs in Spanish narratives than in English narratives (Simon-Cereijido & Gutiérrez-Clellen, 2009). Children with high English experience use more experiential and belief mental states in their narratives than children with more exposure to Spanish (Fusté-Herrmann, Silliman, Bahr, Fasnacht, & Federico, 2006). Balanced bilingual children use more language-dependent cues to recall narratives than children whose proficiency differs between languages (Marian & Fausey, 2006). While monolingual children with lower language skills perform below monolingual children with typical language skills (Greenhalgh & Strong, 2001; Hayward, Gillam, & Lien, 2007; Thomson, 2005), such variations have been examined less frequently in bilingual children. But, bilingual children with lower language abilities do have difficulty recalling stories compared to their typically developing peers (Gutiérrez-Clellen, 2004).

Recent work has explored the relationships between working memory and narrative recall tasks with inconsistent findings. Boudreau (2007) varied the working memory load of stories to reflect simple and complex linguistic and structural complexity. Linguistic complexity was measured by mean length of utterance and proportion of simple to complex sentences while structural complexity was measured by number of protagonists and simple or complex plot line. When 6- to 8-year-old children with language impairment (LI) retold these stories, the number of different words and the number of propositions recalled were significantly lower in more structurally complex stories. Structural complexity in stories placed an increased load on children with lower language abilities suggesting that when working memory demands are increased, deficits for children with LI can be explained in part by deficits in working memory. In contrast, increasing linguistic complexity did not affect performance. Although some links have been found between NWR and grammar tasks across languages (Adams & Gathercole, 1995; Conti-Ramsden, 2003; Girbau & Schwartz, 2007; Sahlén, Reuterskiold-Wagner, Nettelbladt, & Radeborg, 1999), morphosyntactic forms in narrative retells were not affected by increased working memory demands. It could be that linguistic forms initially place demands on children but that once those forms are mastered, they are not as heavy a load on memory as new words and ideas.

Individual differences in ability change the relationship between narrative retell and working memory. For example, in a working memory task of sentence recall which measured words recalled, sentence recall was related to narrative recall as measured by comprehension questions in children with lower language abilities (Dodwell & Bavin, 2008). Variations in the relationship between working memory and narratives by language ability was also found in a recent pilot study with bilingual children. Stronger correlations between NWR and narrative retell were characteristic of children with lower language skills as compared to their typically developing peers (Summers, Bedore et al., 2009). Similar to the relationship between NWR and vocabulary with same-age children, children at an earlier or delayed stage of language learning used similar mechanisms to repeat nonwords and recall key components while their peers with typically developing language abilities may have relied more on their long-term language knowledge and less on the phonological loop to retell narratives.

While links between working memory and narrative recall have been found in some studies, other studies have found no relationship between working memory and narrative retell (Gabig, 2008; Montgomery, Polunenko, & Marinellie, 2009). Possible reasons for these inconsistent findings include differences in stimuli and participants. For example, in terms of stimuli, the nonwords used in the Gabig study were high word-like nonwords, which may have accounted for the absence of relationships to narratives. Digit span was used as the working memory measure in the Montgomery et al. study which does not use phonological working memory in the same way as in NWR. NWR taps into long-term language knowledge more as it activates phonotactic knowledge (Frisch et al., 2000; Gathercole, 2006). In terms of participants, the children with autism in the Gabig study were likely to have different patterns of deficits in language learning than children with language learning difficulties (Pickles et al., 2009; Riches, Loucas, Baird, Charman, & Simonoff, 2010). Also, the children in the Montgomery et al. study were typically developing and may have been past the point when phonological working memory was heavily associated with vocabulary because of their age (Adams & Gathercole, 1995; Gathercole et al., 1992; Jarrold et al., 2004). There may also not have been enough varation in the sample to find a correlation between working memory and narrative recall. A sample with a broader range of language abilities would be more appropriate.

Purpose of the Current Study

The current study seeks to explore the role of working memory, language ability and language experience on narrative retell by using two recall tasks with bilingual children. While both NWR and narrative retells have a heavy memory load, narrative retells are much more dependent on language knowledge than repetition of nonwords. By examining performance on both of these tasks in children with varying abilities and language experiences, our understanding of the underlying mechanisms used to learn language will be broadened. The study will examine narrative retells as predicted by NWR, language experience, and language ability by answering the following questions.

1. Does NWR as measured by total Percent Phonemes Correct (PPC) predict Spanish narrative retell as measured by percent key components (KC) recalled in bilingual children?
2. Does NWR as measured by total Percent Phonemes Correct (PPC) predict English narrative retell as measured by percent key components (KC) recalled in bilingual children?
3. Does the relationship between NWR and narrative retell change with variations in language ability?

4. Does the relationship between NWR and narrative retell change with variations in language experience as measured by current and cumulative experience in English and Spanish?

Chapter 2: Methods

Participants

Participants included a total of 80 children between the ages of 6 and 7 years. All children were in the first grade. Children were all bilingual and represented a range of performance on the Bilingual English Spanish Oral Screener (BESOS) (Peña, Bedore, Guiterrez-Clellen, Iglesias, & Goldstein, in preparation) when they were tested during preschool or early kindergarten. Participants for this study were drawn from a larger ongoing study, the Diagnostic Markers project (DM; PI Peña) which focuses on determining the diagnostic markers of language impairment in Latino English/Spanish bilingual children. The DM is a large longitudinal study with three phases. Phase 1 is a screening phase in which Latino, 4- to 6-year old children were recruited from two Central Texas school districts and one Utah school district. All children were screened in both languages using the BESOS which includes a semantics and a morphosyntax screener in both English and Spanish for a total of 4 subtests. Parents responded to a questionnaire and were asked to report on their child's hour-by-hour exposure and use of Spanish and English (Gutiérrez-Clellen & Kreiter, 2003; Restrepo, 1998). All children had normal hearing as indicated by a hearing screening. Children who had at least a combined 20% of input and output in both English and Spanish as reported in a parent questionnaire were considered bilingual and eligible for participation in Phase 2 and Phase 3 of the study.

Bilingual children who scored below the 30th percentile in at least one subtest in both English and Spanish on the BESOS were invited to participate in follow-up testing in Kindergarten (Phase 2) and first grade (Phase 3). The purpose of Phase 2 and Phase 3 testing was to obtain an accurate picture of the children's language performance in Kindergarten using a variety of assessments that have shown potential for discriminating children with and without language impairment. At the end of the project, data from Phase 3 testing in the first grade will be used to determine a gold standard for diagnosing language impairment in this bilingual population.

The distribution of performance for the Texas bilingual children for the screening phase of the DM is shown in Table 1. Eighty children were drawn for the current study to match this distribution. Sixty-one children were drawn from existing Phase 3 data and nineteen additional children were recruited based on their Phase 1 performance so that the total sample matched the distribution of the larger sample. Specifically, at the time of subject selection for this study, 1198 children had been screened in Phase 1 (Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010), 186 children had participated in Phase 2 testing, and 90 children had participated in Phase 3 follow-up testing. Of these, sixty-one cases from Phase 3 were selected for the present analysis based on their performance on the BESOS and their residence in Texas.

Another twenty-one children from Phase 1 who were not selected for Phase 2 and 3 testing were invited to participate in the study. These children matched the Phase 3 DM children by age and language input/output. They children scored above the 30th percentile on more subtests of the BESOS. To determine the target sample of this second group of children, the original sample of 1198 children was examined. Of the total screened, 370 participants attended the two school districts in Central Texas, were considered bilingual (at least 20% input/output in both English and Spanish), and were in first grade at the time of data collection. Children were selected so that the final sample matched the same proportions as the larger dataset in each of five conditions: failed no subtests, failed one subtest, failed two subtests, failed three subtests, and failed four subtests. Of the 21 children invited to participant, permission was received for 20. One participant was dropped from the study because the child was in Kindergarten and did not meet the selection criteria. Table 1 displays the proportions of the DM participants and the current study participants in each condition.

Table 1

Proportion of Participants from the DM Project and the Current Study

Subtests[a]	DM (n = 370)		Current Study (n = 80)	
	n	Ratio	n	Ratio
0	31	8.4%	7	8.8%
1	58	15.7%	12	15.0%
2	109	29.5%	21	26.3%
3	91	24.6%	21	26.3%
4	81	21.9%	19	23.8%

Note. DM = Diagnostic Markers Project
[a]The number of Subtests for which scores fell below the 30th percentile. For the DM project, the participants had to score below the 30th percentile in at least 1 subtest in each language.

The eighty participants for this study met the following inclusionary criteria:

1. Demonstrated cognitive abilities above a Standard Score (SS) of 80 on the symbolic memory and cube design screening subtests of the Universal Nonverbal Intelligence Test (UNIT) (Bracken & McCallum, 1998).
2. Passed an initial hearing screening or pass a follow-up hearing test.
3. Attended the first grade.

In addition, children with a history of a brain injury, severe social-emotional problems, or an autism spectrum disorder were excluded from the study. Eight participants received regular school lunch while the remaining 72 participants were receiving free or reduced school lunch according to parent report. Thirty-one of the participants were female and 49 were male. Table 2 displays the age and non-verbal IQ scores (based on the UNIT) of the sample. The mean chronological age of the participants was 83.7 months. Average performance on the UNIT was a standard score of 100.9 with a standard deviation of 10.9 which resembles the general population.

Table 2

Age and IQ

Measure	Mean	SD	Range
Age in months	83.7	4.1	73-91
UNIT	100.9	10.9	82-129

Note. SD = Standard Deviation; UNIT = Universal Nonverbal Intelligence Test

To recruit participants, parents of potential participants were contacted, informed of the study, and invited to participate. Parents provided written consent for participation. For those families who did consent, parent interviews were conducted to determine current and previous language experience. Teachers also provided information about current language use in the classroom for each participant by consenting to and completing a questionnaire. All participants completed the NWR task in English and Spanish, the narrative retell in English and Spanish, the BESA in Spanish and English, the TNL and the UNIT.

Measures

Parent and teacher interviews. Parent and teacher interviews were conducted following the same format used in Phase 1 to determine the current language use and the history of language use of each subject. Parents were asked about hourly input and output of the child to determine the current percentage of exposure and use of English and Spanish. Teachers provided the hourly language information for the participant during school hours. Parents were also asked to provide the age at which the child was first exposed to English.

For the purposes of this study, two variables were derived to reflect the current and cumulative language experience for each participant similar to procedures used previously (Summers, Bohman et al., 2009). First, the information obtained about input and output from the teacher was combined with the information from the parent during the times each participant was not at school. The total input and the total output in English were averaged together to create a percentage of English input/output. The same procedure was done for Spanish input/output. Percentages reflect the amount of time a child spends in English and Spanish. Current language experience was reflected by the variable Current English Input/Output. For example, a child with a Current English input/output of 30%, has a Spanish input/output of 70%. The second variable reflected previous language experience in the form of Age of First Exposure to English. These two variables represented two independent measures of language experience.

BESA. Six subtests from the BESA were used for the purposes of this study; English Semantics, English Morphosyntax Cloze, English Morphosyntax Sentence

Repetition, Spanish Semantics, Spanish Morphosyntax Cloze, and Spanish Morphosyntax Sentence Repetition. Subtests were developed following the developmental patterns of each language and are not direct translations. The semantic subtests use conceptual scoring which allows responses in either language (Bedore, Peña, García, & Cortez, 2005). By using conceptual scoring, the focus is on lexicalization of semantic knowledge rather than knowledge of specific lexical items. Preliminary data demonstrates that the BESA Semantics is sensitive to age and ability (Peña, Bedore, & Rappazzo, 2003). Morphosyntax subtests focus on structures that are difficult for bilingual children with LI who have difficulty with different morphosyntactic structures in English and Spanish (Bedore & Leonard, 2001; Muñoz, Gillam, Peña, & Gulley-Faehnle, 2003). The cloze subtests include grammatical completion items and the sentence repetition items require sentences to be repeated. The BESA has been successful is discriminating language impairment in young children (Gutiérrez-Clellen, Restrepo, & Simón-Cereijido, 2006; Simon-Cereijido & Gutiérrez-Clellen, 2009).

The participants were administered the six subtests and scored by 3 bilingual research assistants following the scoring guidelines for the BESA. Nineteen percent of the sample (15/80) was scored again by 3 bilingual research assistants with reliability at 99%. Z-scores for each of the 6 subtests were calculated based on the means and standard deviations of the entire Phase 3 sample from the DM project. Next, for each domain (Semantics, Cloze, and Sentence Repetition) the Z-score from the better language of each participant was averaged to create an overall Z-score (Bedore, Peña, Gillam, & Ho, in press). This overall Z-score was used as the measure of language ability for each participant. The higher subtest scores used to develop the overall Z-scores varied across domains and are summarized in Table 3. Higher scores were fairly balanced across languages except for the Sentence Repetition task with more participants scoring higher in Spanish than in English. Twenty-nine participants exhibited higher scores in Spanish across all three domains with 23 exhibiting higher scores in English in all three domains. Seventeen participants had one higher score in English and 2 in Spanish while the remaining 11 participants had one higher score in Spanish and 2 in English.

Table 3

Number of Participants with Higher Scores by Domain and Language

Language	Semantics	Cloze	Sentence Repetition
English	36	39	33
Spanish	44	41	47

Nonword repetition. The NWR tasks were comprised of two sets of low wordlike nonwords targeted for each language. The items from the English NWR task (Dollaghan & Campbell, 1998) included 4 nonwords each at 1, 2, 3, and 4 syllables levels for a total of 16 nonwords. Spanish nonwords were developed as part of the protocol for the DM project and were based on nonwords developed by Calderón (2003) consisting of 4 nonwords each at 2, 3, 4, and 5 syllable lengths. Seventeen of twenty-two original Spanish nonwords were selected from the nonwords developed from Calderón. As part of the DM project, the 5-syllable nonwords were created by combining a 4 syllable nonword than was not included in the 4 syllable words used with another weak syllable that was low in phonotactic probability. Each set of nonwords was developed following the phonotactic constraints of the target language. In addition, the developers of the words excluded late developing sounds to reduce the influence of articulatory difficulties on performance. Both English and Spanish nonwords were digitally recorded by a male speaker on a Sony recorder (Sony ICD-MS515) with a microphone (Sony ECM-C115) using the software Speech Analyzer 2.7 (Summer Institute of Linguistics).

To ensure that the English and Spanish nonwords were of equivalent nonword likeness, 10 English/Spanish bilingual adults listened to the recordings of the 32 nonwords used in the study (Summers, Bohman et al., 2009). The 32 nonwords were randomized along with seven additional filler nonwords. Each bilingual adult listened to each nonword once and had to indicate if the nonword sounded more Spanish-like or more English-like. Overall, English nonwords were rated as English-like 85% of the time (SD = 11.5). Spanish nonwords were rated as Spanish-like 79.4% of the time (SD = 15.7).

Narrative retell. Two sources of stories were used as narrative retells. One source was wordless picture books in which children were asked to retell a story based on an auditory model and the other was an auditory story with no picture support. For the first source, two wordless picture books were used, *Frog on His Own* (Mayer, 1973) and *One Frog Too Many* (Mayer & Mayer, 1975). The auditory story with no picture support came from the TNL, an English test of narrative ability. For the purposes of this study, only the McDonald’s story was utilized as it is the narrative retell portion of the TNL. In this story, two children go to McDonald’s with their mother, order food, and then realize that the mother left her purse at home.

The percentage of Key Components (KC) used in each story was determined in the following way to parallel the structure of the NWR task in which phonemes have to be repeated accurately. First, words were identified in each model story that carried content information such as nouns, verbs, and adjectives. Next, retells from the larger sample from the DM project were compared to each model story. Rectangular files were used in *Systematic Analysis of Language Transcription (SALT), Research Version* software (Miller & Iglesias, 2008) for the analysis. Of the original list of words, only those that appeared in at least a third of the children's retells were considered to be Key Components (KC). Children had to produce the exact words as the model story to parallel the nature of NWR in which children must produce the exact phoneme to receive credit. The proportion of 33% was used as that was the percentage for which the number of KCs in each frog story was most similar. These procedures were followed for each model story. The total number of KCs in each story can be found in Table 4 (see Appendix A for a detailed list of KCs for each story. More nouns were identified as KCs than verbs or adjectives. Adjectives only appeared consistently in the retells of *One Frog Too Many*. The number of cognates was balanced across languages. For the story *Frog on His Own*, eight of the 32 KCs were cognates in the English story and seven of the 27 KCs were cognates in the Spanish story. For *One Frog Too Many*, two of the 28 KCs were cognates in English and two of the 24 KCs were cognates in the Spanish story.

Table 4

Key Components by Word Class

Story	Nouns	Verbs	Adjectives	**Total**
Frog on His Own				
English	21	11	0	**32**
Spanish	16	11	0	**27**
One Frog Too Many				
English	15	8	5	**28**
Spanish	11	8	5	**24**
McDonalds	4	2	1	**7**

Procedures

As part of the testing in Phase 3 of the DM children completed a NWR task in English and Spanish, narrative retells in English and Spanish, the Test of Narrative Language (TNL) (Gillam & Pearson, 2004), the Bilingual English Spanish Assessment (BESA) (Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, in preparation) and the Universal Nonverbal Intelligence Test (UNIT) (Bracken & McCallum, 1998) during their 3-5 sessions of testing. The participants who were recruited from Phase 1 for this study completed the same protocols in 2 or 3 sessions of testing. In addition, parent and teacher interviews were conducted in person or by telephone. The standardized measures were administered according to the respective guidelines for administration and scoring in the testing manuals.

Nonword repetition. Nonword data for the participants was collected, scored, and analyzed for the purposes of this study. Nonwords were presented to participants individually via a Dell laptop computer (PP11L) through headphones (Labtex Elite-820). Participants' responses were audiorecorded by a microphone (Sony ECM-C115) clipped to a participant’s shirt and recorded on a digital recorder (Sony ICD-MS515). The digital recordings were then transferred to Dell (Optiplex GX620) computers using Digital Voice Editor 2 (version 2.4). Each child was instructed by a bilingual research assistant on the task by saying, “I’m going to play some silly words on the computer. I need you to listen to them and repeat what you hear on the computer.” The instructions were given in either Spanish or English depending on the language of testing. Two practice words were presented prior to the presentation of the nonwords. Each nonword was only presented once.

Transcription, scoring, and reliability**.** A bilingual research assistant transcribed each nonword by listening to the recording through headphones (Labtex Elite-820) using Digital Voice Editor 2. Each phoneme was scored as correct or incorrect. Scoring procedures followed those used by Dollaghan and Campbell (1998). Productions were scored as incorrect if children omitted or substituted the target phoneme. Distortions were scored as correct and additions did not count as errors. When syllables were omitted, the remaining syllables were matched to the target syllables and scored for phonemes in that target syllable while the omitted phonemes were scored as incorrect. For each syllable score, the total number of correct phonemes were divided by the total number of phonemes and reported as percent phonemes correct (PPC). PPC was calculated for each syllable level (i.e., 2PPC, 3PPC, etc.). The PPC for each syllable level was then averaged together for the total PPC of each language yielding an English NWR score and a Spanish NWR score.

Two bilingual research assistants independently transcribed and scored NWR samples to establish reliability. Scores were compared on a phoneme by phoneme level to obtain percent of agreement. For Spanish, 28% of the samples were scored (22/80) yielding an average agreement of 87% (range = 80%-95%). For English, 25% (20/80) of the samples were scored yielding an average agreement of 88% (range = 77%-97%). After establishing reliability, the research assistants listened to the sample together to resolve scoring disagreements.

Narrative retells. For elicitation of the narratives using *Frog on His Own* (Mayer, 1973) and *One Frog Too Many* (Mayer & Mayer, 1975), a bilingual examiner presented the wordless picture book to the child and said, "We're going to look through all the pages of this book and think about what's happening in the story. First I'll tell you the story, and then I want you to tell me the story." The examiner then told the story to the child reading from a scripted story while turning the pages (Miller & Iglesias, 2006). After telling the story, the examiner returned to the first page of the story and said, "Now you tell me the story." The examiner turned the pages of the book as the child retold the story. All examiners were trained on appropriate prompts used during the retelling and included prompts such as "What's going on here?," "yes," and "go on" to encourage children in their retelling. At the end of the story, the examiner asked, "Is that all you wanted to tell me?" Directions and prompts were given in the target language.

According to the TNL procedure manual, children were asked to listen to the McDonalds story that is told with no picture cues. The children then answered a series of comprehension questions after which were instructed to tell the story back to the examiner. Examiners could use the allowed prompt of “What happened to the boy and the girl in the story?” if the child needed facilitation to begin as described in the TNL protocol.

Transcription. The three stories (English frog retell, Spanish frog retell, and the English McDonald’s retell) were transcribed into the *Systematic Analysis of Language Transcription (SALT), Research Version* software (Miller & Iglesias, 2008) in English or Spanish. Transcribers completed about 10 hours of training which included instruction and practice that was supervised by bilingual research assistants on how to transcribe into SALT. Each transcript was divided in C-Units appropriately for English and Spanish which included main and subordinating clauses (Loban, 1976; Miller & Igelsias, 2006). A second bilingual transcriber then listened to each recording and reviewed the corresponding transcript to ensure that transcription was performed accurately in the appropriate SALT format. A third research assistant reviewed the transcription once again to ensure that the transcript was ready for SALT analysis and divided into C-units and root words.

Key component scoring. The percentage of KCs for each participant in the current study was determined by comparing the retells of each of the 80 participants to their respective model stories using another SALT analysis. Finally, the number of KCs that were present in each story was divided by the total number of the KCs in the model story yielding the percent of KCs present in the English frog retell (English KC), the Spanish frog retell, (Spanish KC) and the McDonalds retell (McDonalds KC).

Analysis

Multiple linear regression was employed to help determine which variables of memory, language ability, and language experience could be used to predict narrative retell in both English and Spanish. The dependent variables were the KC variables, English KC and Spanish KC. Due to the low number of KCs (only 7) in the McDonalds story, this variable was examined only descriptively. Thus, two multiple linear regressions were performed; one with English KC as the dependent variable and the other with Spanish KC as the dependent variable. The independent variables served as predictors to determine which variables predicted narrative retell including NWR, language experience, and language ability. A total of five independent variables were entered into each regression to test for direct effects in answering the first 2 research questions of the study; total percent phonemes correct for English NWR and Spanish NWR, overall Z-score from the BESA (language ability), current language experience as measured by English input/output (Current English), and Age of First Exposure to English (First Exposure). Interaction terms were next entered into each regression with the direct variables to test for interactions in answering the third and fourth research questions in the study.

Variables met the assumptions of linearity by visual inspection of scatterplots of unstandardized residuals and independent variables with locally weighted scatterplot smoothing (loess) lines (Keith, 2006). Assumptions of normality were tested by tests of kurtosis, skewness, and visual inspection of data histograms including histograms of standardized residuals. Variables met the assumptions of normality with the exception of ability, which was slightly skewed negatively and leptokurtic with many values centered around the mean (Zar, 1984). Test for significance for all statistical tests was set at the p-value of .05.

The first analysis focused on what variables predicted English narrative retells. Since no *a priori* hypothesis had been made to indicate the order of predictors, the predictors were entered in a direct method of multiple linear regression. Variables were entered into this regression in two steps to test for direct and interaction effects on English KC. Step one tested for direct effects of the five predictor variables; Ability, Current English, First Exposure, Spanish NWR, and English NWR. Step two tested for interaction effects between Ability and NWR, Current English and NWR, and First Exposure and NWR. In this step, the same five predictor variables were entered along with the following cross product terms; Ability by English NWR, Ability by Spanish NWR, Current English by English NWR, Current English by Spanish NWR, First Exposure by English NWR, and First Exposure by Spanish NWR to test for potential interaction effects (Cohen, 1978). Following appropriate methods for testing interactions in multiple linear regression, the continuous variables of Ability, Current English, Spanish NWR, and English NWR were centered before creating the cross product terms (Keith, 2006).

The second analysis focused on what variables predicted Spanish narrative retells. The same 2 step procedure was followed for this multiple linear regression. The first step tested for direct effects of the 5 predictor variables on Spanish KC while the second step tested potential interaction effects on Spanish KC.

Chapter 3: Results

This research had two purposes. First, the effects of NWR performance on narrative retells in first grade Latino children were examined to determine if English and Spanish NWR predicted key components recalled in narratives. The second purpose of this research was to test potential differential effects based on language ability and language experience.

Performance of the 80 participants is found in Table 5. Data from 5 children were excluded from the analysis because stories were not produced. Specifically, five retells were excluded; one Spanish frog retell, two English frog retells, and two McDonalds retells. Of these, four were excluded because the participants did not attempt to tell the stories in that language even though they performed other tasks in the same target language. A fifth narrative could not be transcribed due to poor sound quality in the recording.

Paired *t*-tests were performed on English and Spanish scores for each variable. KC performance was very similar across languages for the frog stories, $t\ (79) = 0.652$, $p = 0.516$. Overall, the participants performed better on the English subtests of the BESA. Scores on the Semantics subtest were significantly higher in English than in Spanish, $t\ (79) = 3.376$, $p = 0.001$. There were no statistically significant differences between English and Spanish on the Cloze subtest, $t\ (79) = 1.698$, $p = 0.093$ or the Sentence Repetition subtest, $t\ (79) = -1.034$, $p = 0.305$. Performance on the NWR task was also significantly higher in English than in Spanish, $t\ (79) = -4.442$, $p < .0001$. Current language experience as measured by input/output was very similar across languages, *t*

(79) = -0.877, $p = 0.383$, indicating that as a group, the children showed balanced use of English and Spanish.

Table 5

Mean Participant Performance

Measure	English		Spanish	
	Mean	SD	Mean	SD
KC				
Frog Retell	66.47%	13.53	64.47%	14.68
McDonalds Retell	58.06%	21.52	n/a	n/a
BESA				
Semantics	70.90%*	12.41	64.22%*	16.53
Cloze	66.43%	25.75	56.44%	31.29
Sentence Repetition	69.70%	22.61	69.92%	25.40
NWR	64.52%*	8.05	59.87%*	8.37
Combined Input/Output	48.19%	18.45	51.81%	18.45

Note. SD = standard deviation; KC = key components; BESA = Bilingual English Spanish Assessment; NWR = nonword repetition
*Performance in Spanish was significantly lower than in English at the 0.05 level

When age of first exposure was examined, participants did not present in a continuous pattern (see Table 6). Rather, participants fell into one of two groupings, those who had been exposed to English from birth and those that had been exposed to English later, coinciding with preschool and kindergarten age. Participants were divided into two groups to better reflect the trend of this variable, Early Exposure to English and Later Exposure to English. Thirty-eight participants were in the Early Exposure group and 42 were in the Later Exposure Group.

Table 6

Age of First Exposure to English

	Early Exposure to English n = 38			Later Exposure to English N = 42		
Age of First Exposure to English	0	1	2	3	4	5
Number of Subjects	26	6	6	9	31	2

McDonalds Retell Analysis

Because there were only 7 key components identified in the McDonalds story, a statistical analysis was not considered appropriate. Table 7 presents the percent of subjects who included each of the KCs in their retells. A consistent pattern did not emerge across word class.

Table 7

Participants Who Included MKCs in the McDonalds Story Retells

Key Components	Number of children	Percentage
Nouns		
McDonalds	71	89%
Car	36	45%
Salad	36	45%
Purse	34	43%
Verbs		
Eat	62	78%
Order	44	55%
Adjectives		
Chocolate	34	43%

Correlational Analysis

Correlations between the independent and dependent variables in the multiple linear regression were examined and are presented in Table 8. Ability (Average Z-score) was significantly, positively, but weakly related to Spanish NWR (r = 0.331, p = 0.003), English KC (r = 0.277, p = 0.014), and Spanish KC (r = 0.277, p = 0.004). These significant relationships indicated that those with higher language abilities tended to be more accurate repeating nonwords in Spanish and more accurate recalling KCs in both English and Spanish retells. Current English input/output was significantly correlated with narrative retells in English (r = 0.410, p < 0.0001) and Spanish (r = -0.545, p < 0.0001). These correlations were more moderate. The more English input/output children were currently experiencing, the more accurate they tended to be at retelling stories in English and less accurate retelling stories in Spanish. Spanish NWR was significantly correlated with English NWR (r = 0.350, p = 0.001) demonstrating that children who can repeat nonwords accurately in one language are likely to do so in the other language. Children who could repeat Spanish nonwords accurately were more likely to recall more items from a story in Spanish (r = 0.305, p = 0.006). But, the same pattern was not seen in English where English NWR was significantly related to Spanish KC (r = 0.247, p = 0.028) but not to English KC (r = 0.215, p = 0.058) although the within language correlation was close to reaching statistical significance. These modest correlations indicated that multicollinearity was unlikely to be a problem in the multiple linear regressions.

Table 8

Correlations between Variables

	Ability	Current English	First Exposure	Spanish NWR	English NWR	Spanish KC	English KC
Ability							
Current English	.082						
First Exposure	-.115	-.127					
Spanish NWR	**.331****	-.047	.123				
English NWR	.113	-.004	-.126	**.350****			
Spanish KC	**.322****	**-.545****	-.009	**.305****	**.247***		
English KC	**.277***	**.410***	-.153	.035	.215	-.056	

Note. Ability = average Z-score on the Bilingual English Spanish Assessment; NWR = Nonword Repetition; KC = Key Components from Narrative Retells
** Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

English Retell Analysis

The first multiple linear regression was performed on English KC. In the first step testing direct effects, the 5 potential predictor variables of Ability, Current English, First Exposure, Spanish NWR, and English NWR were entered in the regression. In the second step testing possible interaction effects, the following cross product terms were added to the model; Ability by English NWR, Ability by Spanish NWR, Current English by English NWR, Current English by Spanish NWR, First Exposure by English NWR, and First Exposure by Spanish NWR (Cohen, 1978).

The multiple regression model testing direct effects (step 1) with all 5 predictors produced $R^2 = .276$, $F(5, 72) = 5.486$, $p < .0001$. The regression coefficients in Table 9 show the extent of the influence of the Ability, Current Experience, First Exposure, Spanish NWR, and English NWR on English KC. The effect of Ability on English KC was statistically significant, $b = .079$, $p = .024$; $CI = .011\text{-}.148$. A one standard deviation (SD) increase in Ability level resulted in a .249 SD increase in English KC (see Figure 1). Current English experience significantly predicted English KC, $b = .278$, $p < .0001$; $CI = .129\text{-}.427$. A one SD increase in English input/output resulted in a .380 SD increase in English KC (see Figure 2). The direct effect of English NWR was also statistically significant, $b = 0.377$, $p = 0.041$; $CI = 0.015\text{-}0.740$. A one SD increase in English NWR resulted in a 0.225 SD increase in English KC (see Figure3). First Exposure with English and Spanish NWR did not significantly predict English KC for this sample.

When the cross product terms were added in the second step of the multiple linear regression to test for interaction effects, the additional set of six predictors were not statistically significant, $\Delta R^2 = .050$, $F(6, 66) = .809$, $p = .567$, suggesting that the influence of NWR on English KC was not moderated by ability level or language experience (Current English and First Exposure).

Table 9

Effects of Predictors on English KC

Variable	ß	*b* (*SE*$_b$)	*p*	95% CI
Ability	0.249	0.079 (0.034)	**0.024**	[0.011, 0.148]
Current English	0.380	0.278 (0.075)	< **0.0001**	[0.129, 0.427]
First Exposure	-0.040	-0.011 (0.028)	0.706	[-0.067, 0.045]
Spanish NWR	-0.093	-0.151 (0.187)	0.423	[-0.523, 0.222]
English NWR	0.225	0.377 (0.182)	**0.041**	[0.015, 0.740]

Note. CI = Confidence interval for *b; SE*$_b$ = Standard Error for *b;* NWR = Nonword Repetition

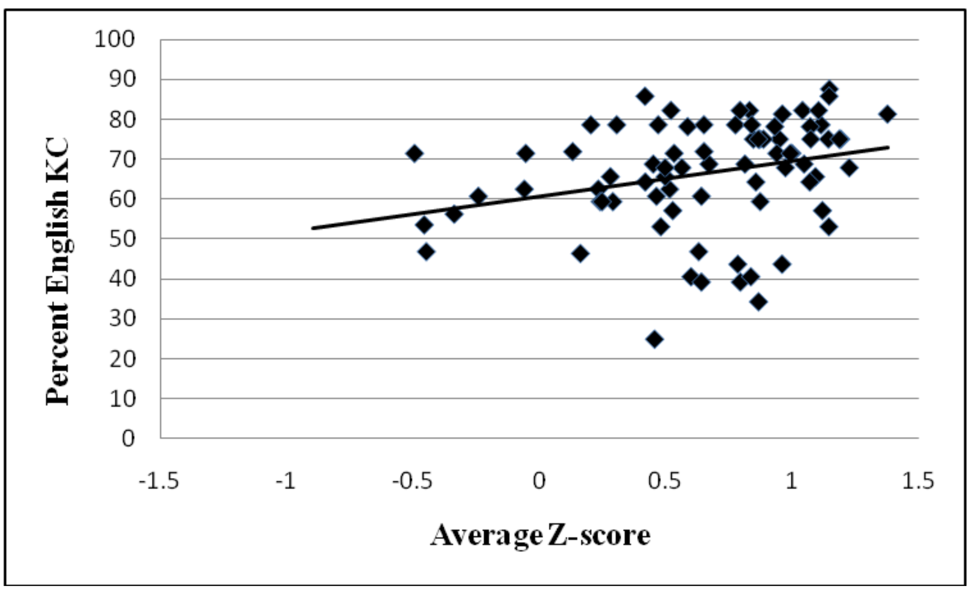

Figure 1. Percent of English Key Components by Ability level.

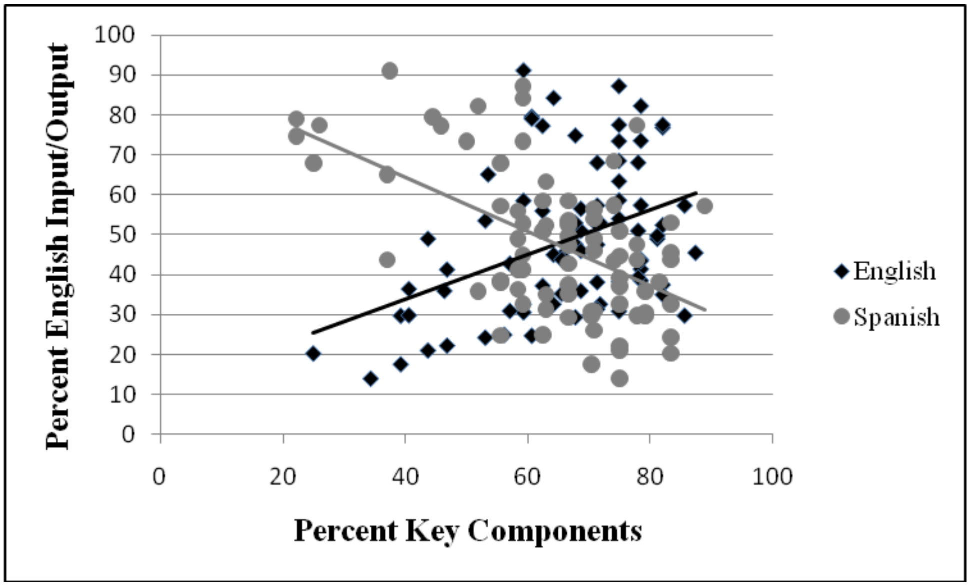

Figure 2. Key Components in Spanish and English by Current English Input/Output.

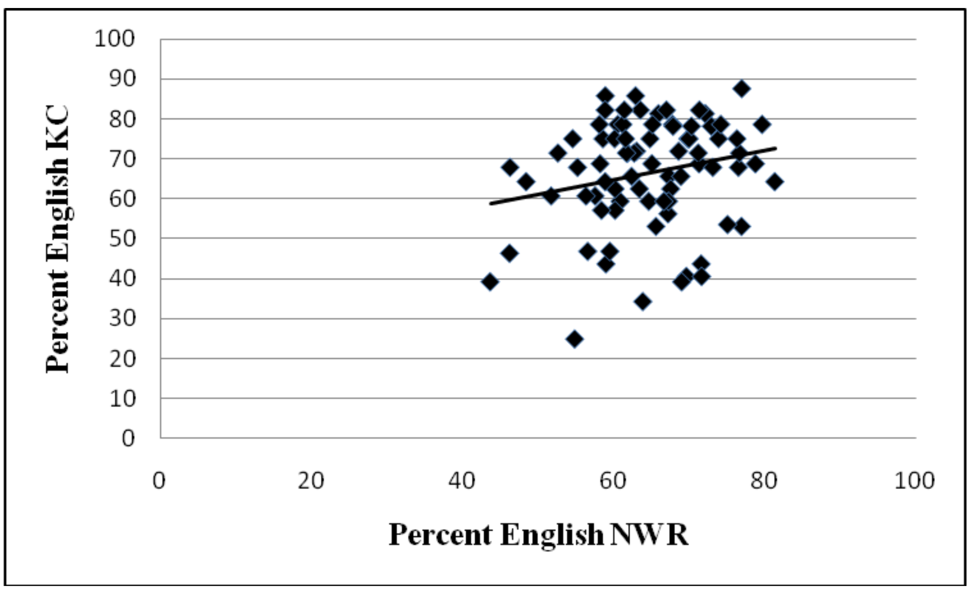

Figure 3. English Key Components by English NWR.

Spanish Retell Analysis

The second multiple linear regression was performed on Spanish KC. In the first step of this regression, five potential predictor variables were entered in the regression; Ability, Current English, First Exposure, Spanish NWR, and English NWR. Cross product terms were added in the second step of the multiple linear regression to test for potential interaction effects; Ability by English NWR, Ability by Spanish NWR, Current English by English NWR, Current English by Spanish NWR, First Exposure by English NWR, and First Exposure by Spanish NWR (Cohen, 1978).

The multiple linear regression model testing direct effects (step 1) with all 5 predictors produced $R^2 = .477$, $F(5, 73) = 13.334$, $p < .0001$. The regression coefficients displayed in Table 10 show the extent of the influence of Ability, Current English, First Exposure, Spanish NWR and English NWR on narrative retells. The effect of Ability on Spanish KC was statistically significant, $b = 0.096$, $p = 0.002$; $CI = 0.037\text{-}0.154$. A one SD increase in Ability level resulted in a 0.297 SD increase in Spanish KC (see Figure 4). Current English experience also was statistically significant at predicting Spanish KC, $b = 0.45$, $p < 0.0001$; $CI = -0.586\text{-}0.313$. A one SD increase in English input/output resulted in a 0.560 SD decrease in Spanish KC (see Figure 2). First Exposure, Spanish NWR, and English NWR did not significantly predict Spanish KC for this sample.

Consistent with the multiple linear regression for English for KC, interaction effects were not statistically significant when the crossproduct terms were added to the model (step 2), $\Delta R^2 = .027$, $F(6, 67) = .616$, $p = .717$, suggesting that children's NWR had the same effect on the ability to retell narratives in both children with different ability levels and different experiences with language.

Table 10

Effects of Predictors on Spanish KC

Variable	ß	*b* (*SE*$_b$)	*p*	95% CI
Ability	0.297	0.096 (0.029)	**0.002**	[0.037, 0.154]
Current English	-0.560	0.45 (0.069)	< **0.0001**	[-0.586, -0.313]
First Exposure	-0.033	-0.010 (0.026)	0.711	[-0.061, 0.042]
Spanish NWR	0.115	0.203 (0.172)	0.244	[-0.141, 0.546]
English NWR	0.168	0.305 (0.168)	0.073	[0.029, 0.639]

Note. CI = Confidence interval for *b*; *SE*$_b$ = Standard Error for *b;* NWR= Nonword Repetition

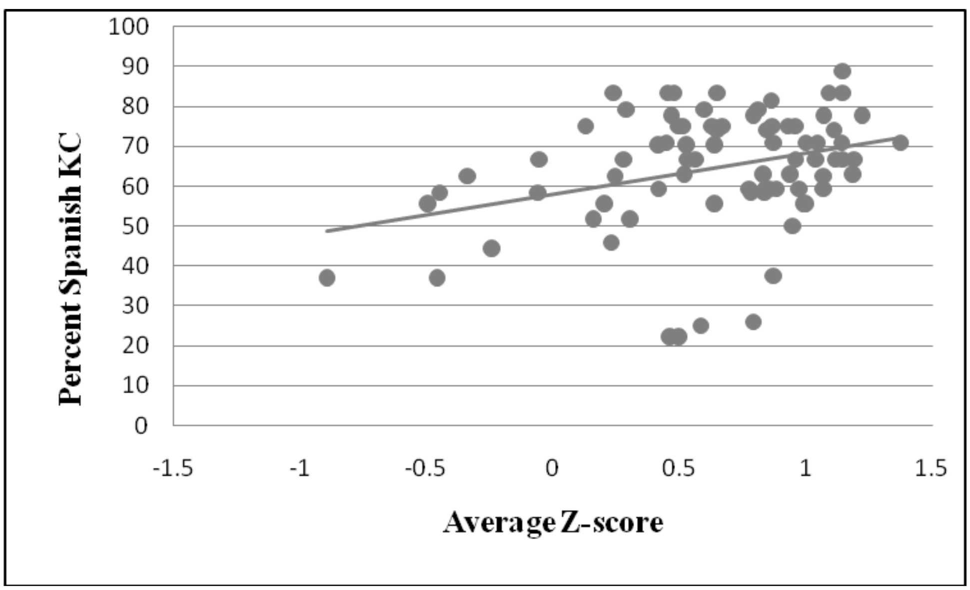

Figure 4. Percent of Spanish Key Components by Ability Level.

Chapter 4: Discussion

The first purpose of this study was to determine what influence NWR has on bilingual children's abilities to retell key components in narratives. A second purpose was to examine the influence of variations in language ability and language experience on NWR and narrative retell. To this end, children repeated nonwords and retold stories in both English and Spanish. Two main findings emerged from the results. First, language ability and language experience predicted narrative retell independently from NWR. Second, NWR influences narrative retell differently in Spanish and English. These findings are explored in more detail.

Language Ability

Consistent with previous work, children with lower language abilities were less likely to recall key components from narratives in both English and Spanish (Bishop & Donlan, 2005; Botting, 2002; Boudreau, 2007; Crais & Chapman, 1987; Dodwell & Bavin, 2008; Epstein & Phillips, 2009; Merritt & Liles, 1987). The measure of key components developed for this study was sensitive to variations in language ability which is consistent with previous work (Plante, Ramage, & Magloire, 2006). Children with high language abilities used more key components in their retells compared to children with low language abilities. Comparison of qualitative differences between children's narratives illustrates these differences. For example, a review of the narratives from the children with the five highest ability scores and the five lowest ability scores revealed qualitative differences (see Appendix B for sample stories). Although stories were of similar length they varied in the quality of words and sentence structures used. The children with lower ability levels tended to use less specific words, especially when referring to characters. For example, one child with low language ability said “animal” to refer to the “frog”, “food” for “butterfly,” and “people” for man and woman. Children with lower abilities also repeated sentence structures more often. The following is an excerpt from the retell of a child with low language ability.

> The big frog was mean.
>
> The turtle was happy.
>
> The dog was happy.
>
> The boy sat him down.
>
> The dog was happier about the frog and the turtle too.
>
> The big frog bite his hand.
>
> The dog and the turtle and boy was angry.
>
> Even the big frog was mean.

Sentence structure was simple in this excerpt following a subject verb object (SVO) structure; six of the eight sentences used the verb “to be” with an adjective to describe the feelings of the characters. Overall, this child’s story followed the pattern of listing events and then telling how each character felt. In contrast children with higher ability levels tended to use more interesting words and more variable sentence structures in their retells. For example, one child with higher language abilities used the words “adventures,” “goodbye,” “something weird” and “nasty frog.” These were words or phrases included in the model that most children did not use in their retells. These qualitative differences were consistent with the KC analysis. Children with higher language skills were able to remember specific words and phrases from the stories in comparison to children with lower language abilities who remembered ideas, but used more general terms.

Despite the variations by ability level, there were no interactions found between ability and NWR. That is, in this study, children's NWR was related to KC to the same degree regardless of language ability. It may be that language ability does not influence the relationship between NWR and narrative retell over and above the influence of ability alone (Catts, Adlof, Hogan, & Ellis Weismer, 2005; Coady et al., 2009; Eisenmajer, Ross, & Pratt, 2005). The regression model accounted for 28% of the variance in English KC and 48% in Spanish KC with ability, experience and NWR scores as predictors. Beyond that, the interaction between Ability and NWR did not account for any significant amount of change in KC. Ability alone may have accounted for enough of the variance with the other predictors that no interaction was detected. An alternative explanation for the lack of interaction between ability and NWR is the age of the participants. The average age of the participants was 7-years-old and they had more experience with both languages than typical foreign language learners (Masoura & Gathercole, 2005). They may already be past the developmental stage where phonological working memory significantly impacts language performance particularly in the area of vocabulary (Adams & Gathercole, 1995; Jarrold et al., 2004). Long-term language knowledge may have been strong enough at that point in development where working memory was not employed as much as it is in younger children to repeat nonwords. A final potential explanation lies in the nature of the ability measure.

Because the higher subtest was used in each domain to reflect the scores of both languages, the average Z-scores of the participants were slightly negatively skewed. More than half the participants had average Z-scores above the median. However, skewness of the ability scores is unlikely to be the reason that no interaction with ability was found because a negatively skewed distribution would be expected when examining language ability (Bleses et al, 2010).

The affect of ability on narrative retells could be accounted for by memory models that can also account for narrative performance. In terms of the memory models discussed in this paper, variations in ability predict narrative retell performance. In Baddeley's model of working memory (2003), the source of variation would need to come from the episodic buffer and not the phonological loop as performance was not mediated by phonological working memory. The episodic buffer and other components responsible for processing larger chunks of language need to be expanded to sufficiently account for these results. A model like the embedded-processes account (Cowan, 1999) in which the limited-capacity region or the *focus of attention,* could be the source of variation in performance by ability. Indeed, areas of the brain that control attention and memory are impacted more in adolescents with language impairment than those with higher language abilities (Ellis Weismer, Plante, Jones, & Tomblin, 2005). Similarly, variation in language ability could be accounted by variation in the underlying language processing system that would affect narrative retell (Potter & Lombardi, 1990). Children with low language skills might also have lower word knowledge in their long-term memory knowledge and have to work harder to access the vocabulary knowledge they do have when compared to children with higher language abilities.

Previous literature has found that NWR is sensitive to variations in language abilities (Gathercole & Baddeley, 1990; Graf Estes et al., 2007; Gutiérrez-Clellen & Simon-Cereijido, 2010). The current study shows that KC is also sensitive to language ability. Both of these tasks rely on some form of working memory and vary by language ability yet they use memory in very different ways. Recalling narratives targets long-term memory and lexical-semantic activation and NWR targets phonological working memory. The fact that both of these tasks vary by language ability can be explained by Cowan's memory model (1999) or a language-based account of memory (Rummer & Engelkamp, 2001) in which an overall deficit in capacity or the language processing system could result in inefficient use of working memory.

Language Experience

While current language experience predicted narrative retell, age of first exposure to English did not. Children who have more input and output in English recalled more KCs in their English retells and less KCs in their Spanish retells regardless of when they had been exposed to English. The opposite was true with Spanish input and output. This result is consistent with memory models (Baddeley, 2003; Cowan, 1999). Performance is increased when a language is more activated than another because of exposure and use in that language. In the case of age of first exposure, understanding of memory models is expanding. Recent and current use of a language helps children activate lexical and conceptual knowledge more so than past experience. This finding is in contrast to a study of NWR in younger bilingual children in which age of first exposure was related to children's abilities to repeat longer nonwords (Summers, Bohman et al., 2009). Differences in experience patterns for NWR and narrative retell lend additional support to the notion that working memory is not highly associated with narrative retell which was confirmed by the absence of an interaction between either language experience variable (Current English and First Exposure) and NWR. The relationship between current language experience and narrative retell did not vary by NWR as it does with vocabulary (Masoura & Gathercole, 2005). Children do not use their working memory skills differently based on language experience to retell stories. They may rely more on ability levels such as the underlying capacity in the *focus of attention* (Cowan, 1999).

Despite the lack of interaction with language experience, there were cross linguistic differences that may suggest some influence of language experience and a role of frequency (Michael & Gollan, 2005). English NWR significantly predicted children's abilities to recall key components (KC) in English narratives which confirmed findings that phonological working memory is related to sentence imitation (Poll, Mainela-Arnold, Miller, Misra, & Sook Park, 2010) and to narrative skills (Boudreau, 2007; Dodwell & Bavin, 2008; Gabig, 2008). But, Spanish NWR did not predict Spanish or English narrative retell and there were no cross language influences. NWR and narrative retell do rely on some similar underlying mechanism, at least in English. As discussed previously, this may be an underlying capacity to use short and long-term memory together, which could be explained by models of memory. The cross linguistic differences might be explained in terms of past experience. As a group, the 80 participants had overall more experience in Spanish than in English, although their language abilities were not weaker in English than in Spanish as (see Table 5). Overall, the children had less experience in English and may have been relying heavily on their working memory to perform language tasks which is consistent with the frequency effect perspective (Gollan & Brown, 2006; Pyers et al., 2009). This suggestion is made cautiously as no significant interactions were found with language experience. More research in this area is needed to understand the influences of language experiences on NWR.

Clinical Implications, Limitations, and Future Directions

NWR has been suggested as a potential tool for assessment in culturally and linguistically diverse students (Campbell, Dollaghan, Needleman, & Janosky, 1997; Ellis Weismer et al., 2000; Kohnert et al., 2006). Narratives are also a focus of assessment (Epstein & Phillips, 2009; Justice, Bowles, Pence, & Gosse, 2010; Peña et al., 2006; Peña, Summers, & Resendiz, 2007) and intervention (Hoffman, 2009; Reese et al., 2010; Swanson, Fey, Mills, & Hood, 2005). Understanding the use of these two tools and how they relate to each other can contribute to a greater understanding of the underlying mechanisms that are affected in bilingual children with lower language skills. This increased understanding can inform diagnostic practices for use with bilingual children. Because children with lower language abilities are affected by complexity in narratives (Boudreau, 2007) looking at the contribution of different levels of complexity in NWR to narrative retell may reveal different patterns as they have with other language tasks. For example, bilingual children who can repeat longer nonwords more accurately are more likely to perform better on morphosyntax tasks in both English and Spanish (Summers, Bohman et al., 2009). To clarify the influence of ability, the contribution of nonwords with different syllable lengths to narrative retell could be examined. It could be that the same performance pattern in narrative retell is seen across ability levels for less complex nonwords (1-2 syllables) but in more complex nonwords (4-5 syllables), performance patterns would vary by language ability (Munson, Kurtz, & Windsor, 2005). Indeed, children with lower language abilities often differ from their typically developing peers more on longer nonwords than they do on shorter nonwords (Graf Estes et al., 2007).

Ability, language experience, and NWR accounted for more in Spanish retells than in English retells. NWR predicted narrative retell equally for children with different language abilities and different levels of language experiences. Yet, the stronger link between English NWR and English Key Components suggests that there may be some differences in the relationship between NWR and Key Components by language in bilinguals that warrant further investigation. Children may be relying more on their working memory to recall key components in English than they are in Spanish. These results are preliminary and would need to be replicated and explored further.

Limitations of this study are a potentially insufficient sample size to examine interactions between NWR and language experience and ability. Future studies might examine just the question of ability and NWR or language experience and ability to increase statistical power. Another limitation is that the key components measure may have not have been demanding enough. The key components were chosen because they were included in at least a third of the stories. An alternative method of selecting key components might be to select those which are most difficult for children with lower language skills and consequently would have more discriminating power. This method of identifying the markers of language impairment could highlight variations by ability level (Bedore & Peña, 2008; Gillam & Pearson, 2004). The results of this study highlight that NWR and narrative retell rely on similar underlying mechanisms. Bilingual children may rely more on working memory to retell narratives in English than in Spanish. Bilingual children are constantly changing their language profiles across development. Their working memory systems are used differently depending on what language they are using. Understanding the working memory system better will aid in the development of appropriate assessment and intervention tools.

Appendix A. Key Components for Each Story

*Cognates

Story	Noun	Verb	Adjectives
Frog on His Own			
English	Boy	Walk	
	Park*	Jump	
	Dog	Catch	
	Frog	eat	
	Turtle*	Feel	
	Bucket	Throw	
	Flower*	Cry	
	Tongue	Sit*	
	Bug	Chase	
	Bumblebee	Bark	
	Man	Run	
	Picnic		
	Basket		
	Hand		
	Cup		
	Boat*		
	Baby*		
	Cat*		
	Bottle*		
	Leg		
	Home		

Story	Noun	Verb	Adjectives
Frog on His Own	Niño/boy	Caminar/walk	
Spanish	Parque/park*	Saltar/jump	
	Perro/dog	Picar/sting	
	Rana/frog	Comer/eat	
	Tortuga/turtle*	Tirar/throw	
	Flor/flower*	Correr/run	
	Lengua/tongue	Hundir/sink	
	Insecto/insect*	Llorar/cry	
	Abeja/bee	Sentir/feel	
	Mujer/woman	Tomar/drink	
	Canasta/basket	Asustar/scare	
	Mano/hand		
	Barco/boat*		
	Bebé/baby*		
	Gato/cat*		
	Casa/house		
One Frog Too Many			
English	Boy	Open	Big
	Pet	Like	Little
	Dog	Bite	Sad
	Frog	Cry	Happy
	Turtle*	Kick	Nice
	Box	Hear	
	Present	Jump	
	Leg	Stick	
	Back		
	Pirate*		
	Tongue		
	Home		
	Noise		
	Window		
	Head		

Story	Noun	Verb	Adjectives
One Frog Too Many	Niño/boy	Abrir/open	Grande/big
Spanish	Perro/dog	Gustar/like	Chica/little
	Rana/frog	Morder/bite	Enojado/angry
	Tortuga/turtle*	Llorar/cry	Triste/sad
	Caja/box	Patear/kick	Feliz/happy
	Regalo/present	Oír/hear	
	Pata/leg	Brincar/jump	
	Pirata/pirate*	Buscar/look for	
	Lengua/tongue		
	Ventana/window		
	Cabeza/head		
McDonalds story	McDonalds	Eat	Chocolate
	Car	Order	
	Salad		
	Purse		

Appendix B. Sample Retells in English and Spanish

Child 1 aged 6;9 is a male (Ability Z-score = -.45; English KC = 47%)
Frog on His Own
English

1. There/'s a boy walk/ing con (su rat i mean su) su dog and su turtle.
2. (um I don't' know)
3. and then (and) there/'s a animal.
4. ((then)) the animal it jump/ed to the sky.
5. ((and)) he was walk/ing and say bye.
6. ((then)) he get up.
7. ((then)) I see the flower/s.
8. ((then)) he get up.
9. (he get a big I mean) he get a (butterf*)>
10. he get a food.
11. ((and)) (that/'s a big) that/'s a big lunch he said the frog.
12. he did/n't notice what it is.
13. it was a bee.
14. it/'s a bumblebee.
15. ((then)) (the then) the animal see (um) the people.
16. they/'re have/ing a picnic.
17. ((then)) he get it inside.
18. ((then)) he look/ing for the food.
19. ((then)) he realize/ed that there was a animal and said "get out of here never come".
20. ((then)) he see a boy sail/ing su boat/s.
21. ((then)) the animal jump/ed to the boat.
22. but ((then)) he fell/ed in the water.
23. so how would I get to the boat?
24. ((then)) they realize/ed somebody/'s (in in their) in their bench talk/ing to the baby.
25. ((then)) he jump to see what it is.
26. ((and)) the (baby/'s) baby/'s look/ing.
27. ((then)) the mother was make/ing su food.
28. ((then)) the animal was get/ing it.
29. ((then)) the baby cry/ed.
30. ((and)) the cat it scare/ed him.
31. the cat was chase/ing it.
32. ((and)) the baby still cry/ing.
33. ((then)) he was walk/ing it faster.
34. ((and then)) he scare to the water.
35. ((and)) (a and) an animal (is) he/'s afraid.
36. ((then)) the boy see him.
37. he say "get out of to my frog leave him alone".

38. ((and)) the dog he said %woof_woof.
39. ((then)) he go to arm/s and sleep.
40. (she go/3s to s*) she go/3s to her home.

Child 2 aged 7;3 is a male (Ability Z-score = 1.19; English KC = 75%)
Frog on His Own
English

1. one day a city park a boy (um) took his pet/s his dog his turtle and his frog to the park.
2. and a bucket.
3. ((and)) the frog jump/ed out.
4. ((and)) he want/ed to have his own adventure/s.
5. ((and)) then the frog said goodbye to his friend/s.
6. ((and then)) he was (slow) slowly look/ing at the flower/s.
7. ((and then)) (he he) he (uh) took out his tongue really long to get a tasty big bug.
8. ((and then)) he ate it.
9. ((and)) (it) something happen/ed.
10. it stunged him.
11. it was a bumblebee.
12. ((and then)) the boy and the girl were have/ing a picnic.
13. ((and then)) the (oh) girl felt something weird.
14. ((and then)) (the frog) it was the frog.
15. ((and then)) she saw it on her arm.
16. ((and)) the man drop/ed his coffee.
17. ((and then)) she said "don't ever come back nasty frog".
18. ((and then)) (he) he spot/ed the sailboat.
19. ((and)) (he and) he want/ed to see if he can jump all the way over there.
20. ((and then)) the boy was got scared.
21. ((and then)) he jump/ed on it.
22. ((and then)) he was cry/ing because (it it uh) it sink.
23. ((and)) his mother took the sailboat out.
24. ((and then)) the frog saw the mother with the basket.
25. ((and then)) he saw it.
26. he jump/ed all the way over there to the boy.
27. ((and then)) the boy (was uh he) he did/n't know what it was.
28. ((and then)) he>
29. the mom was|be (um) give/ing the bottle to his baby without look/ing.
30. ((and then)) the frog was| gonna drink it.
31. ((and then)) the baby/'s cry/ing because he want/3s his bottle.
32. ((and)) the cat was (uh um) try/ing to get him.
33. ((and)) the frog was run/ing away.
34. ((and)) the cat was chase/ing him.
35. ((and then)) the cat got him from his leg and was push/ing him to the ground.

36. ((and then)) (the bar* the or*) the dog (or*) bark/ed at the cat.
37. the boy yell/ed (um) "what are you do/ing to my frog that cat".
38. ((and then)) they went off.
39. ((and then)) the frog (uh) slept on the kid/z arm from all his adventure/s
40. ((and)) that/'s all.

Child 3 aged 6;5 is a male (Ability Z-score = -.89; Spanish KC = 37%)
Frog on His Own
Spanish

1. Allí está cayiendo|caer la paseo.
2. y después +se cayó|caer roca.
3. okay habla un poquito más poquitito más alto.
4. (um) la niña tenía|tener x se fue|ir.
5. ((y)) estaba|auxestar x para um en su x a la pocket.
6. ((y pués|después)) la mamá xx solo.
7. ((y pués|después)) dijo|decir bye.
8. ((y)) (no mi) no scucharon|escuchar.
9. aha.
10. ((y pués|después)) miró|mirar un frog.
11. ((y)) luego xx.
12. ((y pués|después)) pusó|poner eso su x ahí.
13. ((y pués|después)) era la xx.
14, ((y pués|después)) dijo|decir mm rico.
15. ((y pués|después)) +se +la comió|comer.
16. (p*) picó|picar a su lengua.
17. ((y pues)) (su) su xx pobresito|pobre.
18. ((y pués|después)) (cuan* y y) cómo no sabía|saber como +se metió|meter.
19. (x) el señor tomó|tomar <café>.
20. ((y)) la señor tomó|tomar café.
21. ((pués)) (y después) pusó|poner x la señora.
22. xxx.
23. ((y pués)) (uh n*) la nana|rana +se quedó|quedar a su mano.
24. ((y pués)) dijo|decir xx el.
25. ((y)) dice|decir nana|rana nunca +le xx.
26. el señor dijo|decir "ha_ha_ha".
27. ((y después)) estaba|auxestar jugando|jugar con un bote la niño.
28. ((y después)) taba|auxestar saltando|saltar.
29. ((y pués)) él se saltó|saltar[mv].
30. ((y pués)) él +se cayó|caer a la agua.
31. ((y pués)) él dijo|decir "ma adonde andas|andar metida|metir mi papí se cayó|caer[mv]".
32. no sabía|saber que estaba|estar el papá xxx.

33. ((y pués)) cuando taba|auxestar dormiendo|dormir la xx.
34. ((y pués)) +se despertó|despertar la bebé.
35. ((y pués)) era|ser (la) la tiempo de la bebé comida.
36. la nana|rana (tab*) quería|querer[mv]>
37. ((y)) xxx.
38. ((y)) la nana|rana +se fue|ir .
39. ((y pués)) tiró|tirar la lechita|leche de la bebé.
40. <((y pués))> la nana|rana ta|auxestar saltando|saltar muy como podía|poder[mv].
41. como no podía|poder (el la la) la gata +se x.
42. x +la cachò|cachar[mv].
43. ((y)) x tenía|tener miedo.
44. ((y pues)) el niño (dijo uhm) dijo|decir eso pero que +le pantaba|espantar que "deja|dejar mi rana en paz".
45. ((y después)) +se +la llevó|llevar.

Child 4 aged 7;5 is a female (Ability Z-score = 1.22; Spanish KC = 78%)
Frog on His Own
Spanish

1. (uh) el niño tiene|tener (la del el la) el cubo para que ponga|poner a la rana y la tortuga.
2. Y tiene|tener allí que (uh) llevar el perro.
3. <salió|salir>
4. (salió|salir y) Saltó|saltar la rana.
5. ((y)) Y el niño no +se dio|dar cuenta.
6. ((y)) Todavía andaba|auxandar caminando|caminar el niño con el perro y la rana
7. (y el) La rana +se quiso|querer ir solito|solo.
8. (haber) Es|ser que (quiso|querer ver todo) quiso|querer ver el parque él solo.
9. ((Y)) Vio|ver una/s flor/s.
10. ((y)) Iba|auxir a poner su lengua adentro de una flor.
11. ((y)) (acá) Puso|poner su lengua y después se encontró|encontrar un mosco.
12. ((y)) +Se +lo comió|comer.
13. ((y)) +Le picó|picar la lengua.
14. ((y)) Era|ser un>.
15. ((y)) +Le picó|picar la lengua.
16. (y y dejo y) La rana dijo|decir que salga|salir el mosco.
17. ((y)) La rana vio|ver (un señor y una) un señor y una señora.
18. ((y)) (que) +Le andaba|auxandar dando|dar café (en el) en el vaso.
19. ((y)) +Se entró|entrar la rana a la canasta.
20. ((y que)) Iba|auxir meter la señora en su mano.
21. ((y)) La rana tocó|tocar la mano de la señora.
22. ((y)) (ella) Ella +lo sintió|sentir.
23. ((y)) Y sacó|sacar su mano.

24. ((y)) Después sacó|sacar su mano.
25. ((y)) Vio|ver la rana que +se andaba|auxandar colgando|colgar a su mano.
26. ((y que)) +Se cayó|caer el café al señor y también los lente/s.
27. ((y)) +Se +le iba|auxir caer el café arriba de la rana.
28. ((y)) +Le gritó|gritar la señora.
29. ((y)) (um) La rana andaba|auxandar viendo|ver un niño (que) que andaba|auxandar jugando|jugar con su botesito|bote.
30. ((y que)) Quisiera|querer entrar +se al bote.
31. ((y)) Saltó|saltar.
32. ((y)) +Se entró|entrar al bote.
33. +Se andaba|auxandar hundiendo|hundir.
34. ((y)) El niño andaba|auxandar llorando|llorar.
35. ((y)) Su mamá (que) +se tirara|tirar la x para agarrar a su botesito|bote.
36. ((y)) +Se fue|ir la rana.
37. ((y después)) la rana vio|ver (a) a una señora con una carriola.
38. ((y)) (el) El gato estaba|estar a lado (de) de la carriola.
39. ((y)) La rana +se saltó|saltar.
40. ((y)) La mamá andaba|auxandar leyendo|leer (una) el perdiodico.
41. ((y que)) Iba|auxir dar la leche a el bebé.
42. ((y)) +Se levantó|levantar el bebe para ver la rana.
43. (viendo) a viendo|ver la rana.
44. ((y)) La rana estaba|estar arriba de (su) su/s pierna/s.
45. ((y)) El gato +se levantó|levantar.
46. ((y)) La mamá de el bebé no +se fijó|fijar.
47. ((y))+Le andaba|andar le>.
48. La rana iba|auxir tomar (de) del vaso.
49. ((y y)) el bebé (estaba) estaba|auxestar enojado|enojar.
50. ((y)) El gato +se subió|subir a las llanta/s.
51. ((y)) +Se subió|subir al gato.
52. ((y)) Y +se iba|auxir llevar el vasito|vaso a la rana.
53. ((y)) El gato iba|auxir (a) regañar (a) a la rana.
54. ((y)) Andaba|auxandar llorando|llorar el bebé.
55. ((y)) La mamá estaba|estar asustada.
56. ((y)) Estaba|auxestar llorando|llorar el bebé.
57. ((y)) y la mama (ah)>.
58. ((y)) Agarró|agarrar el bebé.
59. ((y y)) El gato andaba|auxandar corriendo|correr para agarrar la rana.
60. (que y) El gato agarró|agarrar a la rana de la pata.
61. ((y despues)) El gato estaba|estar asustado.
62. ((y)) La rana estaba|estar bien asustado.
63. ((y después)) +Se fue|auxir corriendo|correr al gato porqué (la*) ladró|ladrar el perro.
64. ((y)) La rana ya estaba|estar feliz.
65. ((y)) El niño ya andaba|auxandar gritando|gritar.
66. ((y)) (la) La tortuga estaba|estar feliz porque vino|venir su amigo.

67. ((y)) El niño tiene|tener (a) su rana en su brazo.
68. ((y que)) +Se iban|auxir a ir a la casa.

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VITA

Connie Lorene Summers was born and raised in Grand Junction, Colorado to Clarissa Gertrude and Kenneth Kelly Summers. She attended Fruita Monument High School in Fruita Colorado and graduated there in May 1992. In 1992 she entered Brigham Young University in Provo, Utah. She served a mission for her church in Oakland, California from 1995-1997. Following her mission, she returned to Brigham Young University and received the degree of Bachelor of Science there in April, 1998. She then entered Graduate School at Brigham Young University in August 1998 and received her Master of Science in August 2000. During the following years she was employed as a Speech Language Pathologist for Denver Public Schools in Denver, Colorado. She also contracted with other school districts and agencies to perform bilingual speech and language evaluations. In September, 2005, she entered the Graduate School at The University of Texas at Austin. While pursuing doctoral studies at the University of Texas at Austin, Connie taught a course in communication disorders at the undergraduate level. Connie's primary research interests include language development and disorders in bilingual children, language learning, and appropriate assessment and intervention strategies for bilingual children. Publications include:

Summers, C., Bohman, T., Peña, E. D., Bedore, L. M., & Gillam, R. B. (2009). Bilingual performance on nonword repetition in Spanish and English [Electronic Version]. *International Journal of Language and Communication Disorders.*

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Permanent Address: 4973 South Dillon Street, #133, Aurora, Colorado 80015

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