2012

PHONOLOGICAL AWARENESS SKILL OF SEGMENTING IN BILINGUAL ENGLISH/SPANISH SPEAKING 4- AND 5-YEAR-OLD CHILDREN

Kate Lorraine McKay
The University of Montana

PHONOLOGICAL AWARENESS SKILLS OF SEGMENTING IN BILINGUAL

ENGLISH/SPANISH SPEAKING 4- AND 5-YEAR-OLD CHILDREN

By

KATE LORRAINE MCKAY

B.A. Spanish, University of Montana, MT, 2003

THESIS

Presented in partial fulfillment of the requirements

For the degree of

Master of Science

in Communicative Sciences and Disorders, Speech Language Pathology

The University of Montana

Missoula, MT

June 2012

Approved by:

Sandy Ross, Associate Dean of The Graduate School
Graduate School

Lucy Hart Paulson, Chair
Communicative Sciences and Disorders

Amy Glaspey
Communicative Sciences and Disorders

Cindy Leary
Department of Mathematics

McKay, Kate, M.S., August 2012   *Speech-Language Pathology*

Phonological Awareness Skills of Segmenting in Bilingual English/Spanish Speaking 4-

and 5-Year-Old Children

Chairperson: Lucy Hart Paulson

Abstract

      Segmenting, the ability to pull apart words into their smaller linguistic units, is a known predictor of early literacy. This study investigated the segmenting skills (a component of *phonological awareness* PA), in bilingual English/Spanish-speaking 4-and 5-year-old children at the levels of *syllable*, *onset-rime* and *phoneme*. The results of this study were then compared to a previous study that explored PA skill development in monolingual English speaking children of the same ages. The comparative analysis explores how bilingualism impacts PA skill development. This study examined the segmenting skills of 31 bilingual students who attended a Spanish immersion school, the majority of whom identify English as their first language. The 31 monolingual students, with whom the bilingual data was compared, attended an English only school in the same community. The students in both groups were matched by gender as well as by age in months, ranging from 4 years to 5 and one half years of age. By age, the students were grouped into three categories according to six-month intervals (4.0-4.5, 4.5-5.0 and 5.0 to 5.5 years of age). Findings indicated increased segmenting ability for bilingual students versus monolingual students at the *onset-rime* and *phonemic* levels, but no difference was revealed at the *syllable* level. With age, there is evidence of an increased segmenting ability for 5-year-olds versus 4-year-olds at the *syllable* level in both groups, but no significant difference was detected between six-month intervals (i.e. between 4.0- 4.5 and 4.5-5.0, or, 4.5-5.0 and 5.0-5.5 years of age). For the bilingual group, findings indicated an increased ability to detect and produce segments at the *onset-rime* level in English versus Spanish; the differences in segmenting at the *syllable* and *phoneme* levels were not statistically significant. When comparing the segmenting abilities of both groups, this study revealed evidence of an increased segmenting ability in children who learned two languages (English and Spanish) versus those who learned one language (English only).

Keywords: *bilingual, phonological awareness, emergent reading, segmenting, preschool*

TABLE OF CONTENTS

        A. Informed Consent Form-English IRB APPROVED
        B. Informed Consent Form-Spanish
        C. Flyer-English
        D. Flyer-Spanish
        E. Parent/Guardian Survey (background-English)
        F. Parent/Guardian Survey (background-Spanish)
        G. Scripted Instructions
        H. Recording Form
        I. Examiner Comment

List of Tables

List of Figures

Phonological Awareness Skills of Segmenting in
Bilingual English/Spanish Speaking 4- and 5-Year-Old Children

Chapter 1: INTRODUCTION

Purpose Statement

The phonological awareness skill of *segmenting* in preschool and early

kindergarten aged children is known to predict later reading levels in second grade,

(National Institute of Child Health and Human Development, 2000; National Reading

Panel NRP, 2001). The purpose of this study was to identify the segmenting skills of

bilingual English/Spanish speaking, 4-and 5-year-old children, in both English and

Spanish, as an exploration into the current problem, that the reading scores of bilingual

students are consistently lower than their monolingual peers (Ayer, Haynes, Hook &

Marcuso, 2010; U.S. Department of Education, 2005, 2007). The bilingual participants

in this study learned primarily English in the home environment, and Spanish at school,

in a language immersion model. Using the same test items, the bilingual participants'

average scores on segmenting tasks were compared to the average scores of monolingual

English speaking 4- and 5-year-olds to identify similarities and differences in

phonological awareness acquisition and acuity between the two groups. This study was

intended to contribute to the growing body of research concerning the disparate reading

abilities of bilingual (English/Spanish) and monolingual (English) students in the United

States.

Statement of the Problem

English/Spanish bilinguals are the fastest growing student group in the nation's

elementary and secondary schools (Dickinson, McCabe, Clark-Chiarelli & Wolf, 2004).

According to the National Assessment of Educational Progress (NAEP), the number of English Language Learners (ELLs) in public schools in the United Sates grew by 95% between 1991 and 2002, and three fourths of those ELLs came from homes where Spanish is the primary language (Cárdenas-Hagan, Carlson & Pollard-Durodola, 2007). Mirroring this trend, Spanish immersion schools have also gained in popularity.

While the U.S. school system tries to accommodate this fast-growing bilingual population, studies show that "Spanish-speaking children are twice as likely to as non-Hispanic Whites to read below age level in English" (Hammer, Miccio & Wagstaff, 2003, p.20). Addressing the sub-standard reading abilities in the bilingual sector of the U.S. education system has become an urgent matter and one whose resolution could have positive effects in terms of social justice and economic development.

The development of *phonological awareness* (PA) has been identified as one of the best predictors of reading achievement between kindergarten and second grade (NRP, 2001; Snow, Burns & Griffin, 1998; Whitehurst & Lonigan, 2002). It appears that children with better PA skills often learn the alphabetic principle more quickly. On the other hand, children with underdeveloped PA skills in preschool are some of the poorest readers in later years because those students, in turn, have trouble learning how to decode (Brice & Brice, 2009; NRP, 2001, Snow et.al, 1998).

Current research supports that PA skills transfer from first language (L1) to second language (L2) as well as from L2 to L1; the relationship is not one-directional (Culatta, Reese & Setzer, 2006). The ability of the bilingual child to attend to the phonological features of two languages suggests an increased *metalinguistic* ability, the ability to reflect on language, and, also to an inherently increased capacity for

phonological awareness (Scarpino, Lawrence, Davison & Hammer, 2011). However, even with an increased capacity for phonological awareness (in the bilingual student), evidence continues to demonstrate reduced reading abilities in this population. Using PA tasks as diagnostic measures and as teaching tools for PA skill development is a possible means of supporting early literacy. First, however, investigation into the PA skill development, in this subset of students, is warranted to identify the relationship between dual language acquisition and early reading abilities.

Research Question

The primary research question for this study is, *what are the segmenting abilities of English/Spanish bilingual children who are 4 and 5 years old*?

Subsidiary Questions. The subsidiary questions are:

1. With English only stimuli, is there a difference in the segmenting abilities of bilingual (English/Spanish speaking) 4-and 5-year-old children when compared to monolingual (English speaking) 4-and 5-year-old children in three levels of segmentation?

1a. Syllable

1b. Onset-Rime

1c. Phonemes

2. With English only stimuli, is there a difference in the segmenting abilities of bilingual (English/Spanish speaking) *and* monolingual (English speaking) children who are 4.0-4.5 years old, 4.5-5.0 years old and 5.0-5.5 years old in three levels of segmentation?

2a. Syllable

2b. Onset-Rime

2c. Phoneme

3. With English and Spanish stimuli, is there a difference in the segmenting abilities of bilingual (English/Spanish speaking) 4-and 5-year-old children between English and Spanish stimuli in three levels of segmentation?

3a. Syllable

3b. Onset-Rime

3c. Phoneme

Research Hypotheses

Null Hypotheses. The following are the null hypotheses:

1. There will be no important and statistically consistent difference between the average raw scores on segmenting skills tasks in English between bilingual (English/Spanish speaking) children and monolingual (English speaking) 4-and 5-year-old children in three levels of segmentation *syllable*, *onset-rime*, and *phoneme*.

2. There will be no important and statistically consistent difference between the average raw scores on segmenting skills tasks in English for bilingual (English/Spanish speaking) and monolingual (English speaking) children who are 4.0 to 4.5, 4.5 to 5.0 and 5.0 to 5.5 years of age in three levels of segmentation *syllable, onset-rime* and *phoneme*.

3. There will be no important and statistically consistent difference between the total average raw scores on segmenting skills tasks in for bilingual (English/Spanish speaking) 4-and 5-year-old children between the English and Spanish stimuli in three levels of segmentation *syllable, onset-rime* and *phoneme*.

Limitations.

 Limitations of the Study are as follows:

1. Participants in this study are sequential and simultaneous bilingual language learners. No participant in this study is exposed to Spanish only in the home. This subset of bilingual language learners does not reflect bilingual language learners who are exposed to Spanish only in the home and English at school. Generalizability will be limited to populations that are similar to the study sample.

2. Socioeconomic level of participants was not considered in this study. While SES can have an effect on child development and education (Dickinson, 2004); it was considered neither inclusionary nor exclusionary criteria for participation in this study.

3. The segmenting tasks designed for this study were developed from a previous study of PA skills in monolingual speakers. Measures were exacted to accommodate differences in linguistic structures between the languages but to maintain the integrity of construct validity of the task items. The need for an assessment of bilingual phonological awareness continues.

Definition of Terms

The terms defined in this section were obtained from current research in the fields of phonology, phonological awareness and dual language learning. Defined terms (1, 2, 4, 5, 8-13, 16,17 20) are found in the doctoral dissertation (Paulson, 2005, p.11-12) from which the monolingual data was obtained for comparative analysis. Terms (6,7, 21) are defined by Dalbor, 1997; terms (3,18,19) are defined by Goldstein, 2004, terms (14,15) defined by Gillon, 2004.

1. <u>Alliteration</u>: is a phonological awareness skill that requires the identification and production of words that begin with the same sound

2. <u>Alphabetic Principle:</u> is an understanding of the correspondences between letters or groups of letters and their pronunciations

3. <u>Bilingual:</u> use or ability to use and understand two languages

4. Blending: is a phonological awareness skill that requires combining a sequence of isolated syllables or phonemes together to produce a word

5. Deletion: is a phonological pattern of omitting a phoneme or syllable from a target

6. Diphthong: a sequence of vowels in which there is a change in quality during their production

7. Hiatus: is a sequence of vowels in Spanish containing either a stressed /í/ or /ú/ creating an additional syllable and not a diphthong

8. Isolation: is a phonemic awareness skill in which a phoneme is isolated from the rest of a word; it is the first task required in segmenting tasks at *onset-rime* level

9. Onset: is the beginning consonant or consonant cluster of a word (i.e., /c/ in cat, /sl/ in slide)

10. Phoneme: is an individual speech sound

11. Phonemic Awareness: is the awareness of the sound structure of language and the ability to reflect on and consciously manipulate the sounds of speech

12. Phonological Awareness: is the awareness of the sound structure of language and the ability to reflect on and consciously manipulate the syllables and sounds of speech

13. Phonology: is the study of the sound system of language and the rules used to put sounds together to make words

14. Phonotactics: is the specific branch of phonology that deals with restrictions in a language on the permissible combinations of phonemes

15. Phonotactic Constraints: are the rules of a language that govern permissible word and syllable shapes

16. Rime: is the ending part of a word including the vowel and final consonant sound(s) (i.e., /at/ in cat, /ide/ in slide)

17. Segmentation: is a phonemic awareness skill that requires the analysis of speech and breaking it into individual words, syllables, onset and rime, or phonemes

18. Sequential Bilingual: is a person who acquires a second language (L2) after acquiring general knowledge of the first language (L1)

19. Simultaneous Bilingual: is a person who learns two languages from birth

20. Substitution: is a phonological pattern in which one sound is replaced by another sound

21. Syllable: is a unit of speech sounds that can influence the rhythm of a language

Chapter 2: REVIEW OF LITERATURE

Since PA skills are predictive of early reading ability, and bilingual (English/Spanish) students consistently score lower than monolingual (English) students it is important to uncover developmental trends in PA abilities between the groups (Ayer et.al, 2010; U.S. Department of Education, 2005, 2007). In exploring awareness of language sounds and patterns it is also important to examine differences in language sounds and patterns between English and Spanish. While the two languages share some features, there are inherent differences in stress patterns, syllable shapes, individual sounds, and acceptable sound combinations.

This section contains a brief review of recent research concerning the linguistic differences between English and Spanish as well as some developmental patterns established by students who learn both languages. This comparative includes a review of the differences in the sound systems (phonologies) of English and Spanish as well as the phonological rules (phonotactic constraints) of each language, by which those sounds can be used. With analysis of the phonotactic constraints of each language, there is a subsequent investigation into the PA skill development, or the language learner's understanding of these constraints. Since the rules of each language are different and so too are the salient phonological features, it follows that the PA skills of bilingual and monolingual students will reflect these differences. Illuminating the phonological rules and features of each language will help to establish possible patterns in PA skill ability and development for both the bilingual (English/Spanish) and monolingual (English) speaking student groups. Investigating these differences is important for understanding

the effects of bilingualism and for creating a framework for assessment and support in the classroom for this rapidly growing population.

Bilingualism

In many areas of the world, including the United States, some children learn more than one language. Bilingualism can be a regional norm, a measure of cultural preservation or even an extracurricular endeavor (Tedick, Christian, Williams & Fortune, 2011). In other cases, families enroll their children in language immersion schools for either assimilation into the mainstream culture or communication with members of the non-dominant culture. Immersion programs are currently attracting attention because of the impact of globalization on commerce, economy and education.

In the cases of Spanish immersion schools in the United States, students generally come from English-speaking homes and are introduced to Spanish language and culture in the school environment. Immersion refers to schools that explicitly teach the target language and instruct other subjects in that language as well (Tedick et.al, 2011).

Students in immersions schools are often *sequential* bilinguals. *Sequential* bilinguals learn a second language (L2) after acquiring general knowledge of the first language (L1); *simultaneous* bilinguals learn both languages from birth (Gorman & Gilliam, 2003). While the terms *sequential* and *simultaneous* dual-language learners have been widely used for decades (Goldstein, 2004), there is currently an active academic movement to recognize bilingualism as a first language. Since language is inextricably linked to culture and cultural identity, a bilingual/bicultural person is not a person divided but rather he/she is a *whole* person with rich linguistic and cultural experience. This explains the impetus for recognizing bilingualism as a unified experience. Bilingualism

as a First Language (BFL), is largely an academic movement, which has little bearing on immersion programs designed for sequential bilingualism (Goldstein, 2004).

Whether a bilingual student learns English and Spanish simultaneously or sequentially, he/she will need to learn sounds and sound combinations of each language as well as their unique patterns of production. Vacillating between languages requires awareness of the differences between the languages in terms of both production and listener perception (Yavas & Goldstein, 1998, p.49).

Language Systems: English and Spanish

Languages are complex systems of sounds, sound patterns, and rules that govern how those sounds and patterns can be used (Gorman & Gilliam, 2003). Phonological differences between Spanish and English exist in: stress and rhythm, syllable shape, quantity of phonemes, and in the acoustical quality of some shared phonemes. The rules of each language, in terms of how, when and where certain sounds or phonemes are acceptable, are known as *phonotactic constraints* (Gillon, 2004). A bilingual language learner must learn the rules of each system and, also, how sounds and stress must be manipulated from one language to another. According to Gildersleeve-Neumann, Kester, Davis, and Peña (2008), "Bilingual acquisition requires mastery of the phonological knowledge base and the production system requirements for phonemes, syllable and word shapes in both languages" (p.316). Looking at these differences in system requirements highlights the complexity of dual language learning.

Stress and Rhythm

Traditionally, Spanish is considered a *syllable-timed* language, and English is a *stress-timed* language (Bunta & Ingram, 2007). *Syllable-timed* languages have a less

complex syllable structure than *stress-timed* languages. Generally, *syllable-timed* languages are thought to have equally timed syllables and *stress-timed* have equally timed interstress intervals. However, current research supports the idea that both English and Spanish share features of both *syllable-timed* and *stress-timed* languages and that speech rhythm is largely perceptual based more on the listener's experience and familiarity with the language than with objective scientific measures stress and timing (Bunta & Ingram, 2007).

Appropriate speech rhythm is acquired passively, by listening to the language in their environments. Rarely do young language learners need explicit instruction in the rhythm of their native language. Bunta and Ingram (2007) cite a study by Jusczyk (2000) which found that children as young as 4 months distinguish their native language from a foreign language based on prosodic cues or the intonation pattern, alone (p.1000). When children perceive the rhythm of their maternal language, they are also attending to the linguistically relevant units of speech. Bunta and Ingram (2007) cite Werker and Vouloumanos (2000) who found that "by 6-7 months of age, infants use overall rhythm to predict clause and phrase boundaries" (p.1001). This suggests that when infants perceive the native rhythm of speech, they also perceive the how fluent speech is segmented into smaller units. Bunta and Ingram (2007) contribute that the perception of smaller linguistic units may form the basis of phonological acquisition (p.999).

Syllable Shape

Generally, words in Spanish (measured by the number of syllables) are longer than words in English. The canonical, or most frequently occurring, syllable shape in English is consonant-vowel-consonant (CVC) as in the word "cat". The canonical

syllable shape in Spanish is consonant-vowel-consonant-vowel (CVCV) as in "casa" (Goldstein, Fabiano, & Washington, 2005). Most syllables in Spanish end in a vowel sound of either /a/ or /o/. In Spanish, consonants in the word-final position are less frequent than in English and are constrained to only /d, j, l, n, r, s, and z/ sounds (Gorman & Gillam, 2003). English words have a much larger inventory of final consonant sounds.

As a syllable-timed language, Spanish syllables are more uniform and easily perceived. It would follow then, that *syllables* are more readily identifiable by Spanish speakers than speakers of a stress-timed language (Gorman & Gillam, 2003, p.14). In English, a stress-timed language, syllable length fluctuates according to stress, suggesting that *stress* is a more salient linguistic feature than the *syllable* (Dalbor, 1997). For a bilingual English/Spanish language learner, he/she must attend to the differences in stress and syllable timing, largely based on acoustic perceptions, in order to achieve a natural accent.

Phonemic Similarities and Differences

In all, English has more sounds than Spanish. Accounting for dialectical variations, Spanish has 23 or 24 sounds (Dalbor, 1997, p.114) and English has 41 sounds (Gillon, 2004, p.7). The phonemic inventories of both Spanish and English share the following consonants /b, p, d, t, g, k, n, l, ch, s, j, w/. The consonants /x/, as in 'México', /ñ/ as in 'mañana' and the trilled /r/ occur in Spanish but not English. The consonants /v, z, sh, h/, the voiceless /th/ as is 'bo*th*' the voiced /th/ as is '*th*at', /zh/ as in the middle sound in 'measure' and /j/ as in the first sound in 'judge', occur in English but *not* Spanish.

Consonant clusters and types of clusters are also more constrained in Spanish than in English (Gildersleve-Neumann et.al, 2008). Adjacent consonants in the same syllable form a *consonant cluster* (i.e. <u>sp</u>oon) and adjacent consonants across syllable boundaries are known as *sequences* (i.e. ba<u>sk</u>et). No words, or syllables, in Spanish can begin with the consonant clusters **sl-, rl-**, **st-** or **sp-**, and the consonant cluster **ns-**can be found at the end of a syllable but not at the end of a word (i.e. i**ns**-tan-te) (Dalbor, 1997, p.126).

In addition to consonants, there are also differences between Spanish and English vowel systems. The Spanish vowel system is simple and symmetrical while the English vowel system is varied and complicated (Dalbor, 1997). Spanish vowels are the same in every dialect of the language. A Spanish speaker from Spain and one from México will use the identical vowel system (Dalbor, 1997). Spanish has five tense vowels, /a, e, i, o, u/, and 14 diphthongs. Diphthongs are two vowels immediately next to one another that are combined to make one sound as in the vowel sound in 'h<u>ou</u>se'. In Spanish, diphthongs must contain an unstressed /i/ (i.e. seis), or, an unstressed /u/ (i.e. bueno) fused into a single syllable; they are [ai, ei, oi, au, eu, ou, ia, ie, io, ua, ue, uo and iu, ui]. If the adjacent vowels contain a stressed /í/ or a stressed /ú/, there must be another syllable (called a hiatus) and not a diphthong. Examples of stressed /í/ and /ú/ paired with other vowels to create a hiatus include, mío, which is produced mí-o and continua, which is produced con-ti-nú-a (Dalbor, 1997, p.126).

On the other hand, English has between 15 and 19 vowel sounds, and 5 and 10 diphthongs, considering all of the allophonic variations between English dialects (Bauman-Waengler, 2009). Depending on how the vowel sounds are combined in

syllables, some English dialects have more than 40 possible vowel sounds (Dalbor, 1997

p.138). Vowel sounds also vary between English dialects. To use a familiar example, an

English speaker in Boston will pronounce the word 'car' as 'ca' with a vowel sound not

found in other English dialects. In contrast with Spanish, the English vowel system is

more complicated and variable.

 The uniformity of the Spanish vowel system makes it easier to distinguish vowels

across dialects, where English vowels are less readily identified. Gorman and Gillam

(2003) cite a well-known study by Manrique (1979), which found, "Spanish speakers

identify (vowels) with 97% accuracy in isolation and 99% accuracy in context. In

contrast, English speakers correctly identify vowels in isolation 58% of the time and 83%

of the time in context" (p.15).

 To generalize the differences, Spanish has fewer sounds (both consonants and

vowels), an emphasis on the syllable for rhythm, and a more constrained and simple

syllable structure. English has more sounds than Spanish, an emphasis on the interval

between one primary stressed syllable to the next, and a less constrained and more

variable syllable structure. Each language has a set of phonological rules; and, a person

learning both languages will need to acquire knowledge or perception of these

constraints. This raises the questions: 'How do phonological rules impact the speaker

learning the two systems? What phonological patterns will emerge in the bilingual child?

Will there be *transfer* or *interference* between the language systems?

Phonological Patterns

Phonological Patterns (Spanish→English)

 According to Yavas and Goldstein, (1998), *phonological interference* is the

substitution of a phoneme or phonological pattern in L2 that exists only in L1.

Phonological interference can be exhibited when (1) a phoneme does not exist in L2, (2)

an allophone (acceptable variation of a phoneme) exists in L1, or (3) phonotactic

constraints exist in L1, which prohibit the articulatory routines of native speakers of L2.

For example, a child whose L1 is Spanish will likely produce /v/ as either /v/ or /b/ since

/v/ is an allophone of /b/ in Spanish (Yavas & Goldstein, 1998). Similarly, a child whose

L1 is Spanish would likely produce /sh/ as /ch/, since the phoneme /sh/ does not exist in

Spanish; therefore, the English word "shake" will be produced "chake". Lastly, a child

whose L1 is Spanish will likely add a syllable to a word by inserting an unstressed vowel

before a consonant cluster (e.g. /st/→ /ehs-t/) since there exists a phonotactic constraint in

Spanish which prohibits a syllable from beginning with an **st** consonant cluster (Dalbor,

1997). Therefore, an English word, such as "stars", will likely be produced as "ehs-tarz".

Another possible production of this word for a bilingual speaker (whose L1 is Spanish)

would be "tarz", as 'consonant cluster reduction' would have the effect of preventing a

syllable from beginning with that cluster (Goldstein, 2004).

　　　　Another likely production pattern for a child whose L1 is Spanish is the deletion

final consonants. In looking at the canonical syllable shape in Spanish (CVCV) and the

canonical syllable shape in English (CVC), there is a linguistic construct that underlies

the pattern of interference. Final consonant deletion is a type of segmental interference

that is expected from sequential bilinguals whose L1 has few syllable final consonants

(Spanish, Portuguese, Italian) (Yavas & Goldstein, 1998). For example, a Spanish

speaker may produce the English word 'top' as 'ta', which will negatively affect

intelligibility in English more than Spanish, as it will often change word syllable stress

(Gorman & Gillam, 2003).

Phonological Patterns (English➔Spanish)

Similarly, for the growing number of language learners for whom English is L1 and Spanish is their L2, the rules of English will also affect Spanish productions (Dalbor, 1997). Students who speak primarily English, and are learning Spanish, may exhibit some phonological interference. Even with shared phonemes, those that are found in both English and Spanish, there are differences in articulation and acoustical properties that can contribute to a pattern of interference. For example, the consonant /p/ in Spanish is unaspirated, which means that there is no 'puff' of air released with the sound. In English, the /p/ is aspirated, or, produced with a 'puff' of air in all cases, except when it follows an /s/ as in *spin*. An English-speaking student of Spanish might use the aspirated /p/ incorrectly in words such as 'pantalones'. Similarly, /t/ is never aspirated in Spanish; but, it is in the word-initial position in English. When learning Spanish, an English-speaker will learn that the /t/ in "taco" has a different voice onset and is produced more similarly to /d/ and not as the /t/ in the English word 'tin' (Dalbor, 1997, p.2, p.121).

Syllable duration will likely also affect production. In a classic study, (Delattre 1965), it was revealed that stressed syllables in Spanish are 1.2 times longer than unstressed syllables and in English they are 1.5 times longer (Yavas & Goldstein, 1998, p.54). In addition, all Spanish words have at least one primary stress, where as short words in English are normally unstressed or weak-stressed. For example, in the English word, 'her', the utterance 'tell her' will likely be produced as 'te-ler' with less stress on the second syllable. For the child who speaks a stress-timed language (e.g. English) and who is acquiring a syllable-timed language (e.g. Spanish) with inherent differences in

duration, his or her production pattern in Spanish will be marked by non-native English-like syllable length.

Another important consideration addresses cognates, which are words with similar origin and sounds between languages (Dalbor, 1997). English stress is often different from their Spanish cognate. Here, a native English speaker will need to alter the stress in the Spanish cognate to achieve Spanish stress pattern (accent is Spanish and bold is English); demócrata-**de**mocrat, teléfono-**te**lephone, acróbata-**a**crobat (Dalbor, 1997, p.45). It is important to note that less research has been published concerning phonological interference in English→Spanish sequential bilinguals than phonological interference Spanish→English. Patterns of L1 interference during L2 acquisition (either Spanish or English) should exist only until L2 phonotactics are learned, a process known as *forward transfer*.

Forward Transfer

Every language has a unique set of features; between languages there are differences in sounds, sound combinations, stress and rhythm (Yavas & Goldstein, 1998). These features are also the conditions for possible patterns of interference in second language acquisition. The process of *forward transfer* (FT) is a means of acquiring a second set of linguistic cues after the first language (L1) is established. FT asserts that a bilingual speaker transfers the linguistic cues from one language to the next until the rule systems of L2 are assimilated. For example, the word-order cue for 'cold water' for a Spanish speaker is '*agua fria*'. Using FT, the child will say '*water cold*' until the linguistic cues in English develop appropriately, and the ultimate production is '*cold water*' (Gorman & Gillam, 2003).

Since syntactic and linguistic cues transfer forward from L1 to L2, so too should phonological information. This process is known as *phonological translation*, or, "the ability to hear a word in one language and convert its phonological form into another language" (Gorman & Gillam, 2003). An example of phonological translation is seen in the pronunciation of proper names from English to Spanish (i.e. Matthew →Mateo). Here, the medial phoneme /th/ is replaced by /t/, a dental fricative that does not exist in the Spanish phonemic inventory. Similarly, with (Ronaldo→Ronald), the phonological translation will include reducing the number of syllables from three to two, changing the stress to initial syllable and creating a final consonant cluster. For a proficient bilingual speaker, phonological translation is automatic.

Awareness of Language Sounds and Structure

Translating phonological information from one language to the next require awareness of the sounds and structures of each language (Gorman & Gillam, 2003). Awareness of the sounds and structures of more than one linguistic system, and transferring information from one system to the other, demands a level of abstract thinking. This is known as *meta-phonological awareness* (MPA). MPA is the capacity, which allows the language learner to reflect not only on linguistic units, but to reflect upon languages as whole systems. This idea lends itself to the idea that sound awareness skills in the bilingual child are not specific to one language, but are necessarily more refined than those skills in the monolingual speaker because of their increased exposure to linguistic information (Durgunoglu, 1993; Stewart, 2004).

Between the ages of 2 and 5 years, young language learners learn to use and discriminate the phonological patterns of their ambient language(s) (Gildersleeve-

Neumann, et. al, 2008). As discussed earlier, each language has its own salient phonological features, which are acquired by certain ages according to the normative data of each respective system. Current research supports the idea that overall language acquisition in rate and achievement is similar between Spanish and English monolingual children (Gildersleeve-Neumann et. al, 2008, p.316). Introducing the concept of MPA, the bilingual child, acquiring more than one phonological system, will achieve the sound awareness skills according to standards of acquisition, but also the ability to process information across languages. The tasks used to measure sound awareness and sound manipulation are the products of research into phonology and phonological awareness.

Phonological Awareness

Phonology is defined as "the study of speech sounds, speech sound production, and the rules for combining sounds in meaningful words and sentences" (Pena-Brooks & Hedge, 2007, p.61). Gillon (2004) relates a study (Gopnik, 1999) which found, that babies are able to distinguish between the speech sounds that are part of their language from speech sounds spoken in other languages as young as five months of age. That is to say, they can determine if a sound or word belongs in their language without conscious awareness of the rules of their language. Processing phonological information enables children to develop speech by discriminating between acceptable and unacceptable variations of words based on the phonological features of their native language (Gillon, 2004).

When a person acquires more than one phonological system, each with its own sounds and structures, he/she must discriminate between what is acceptable and unacceptable in each language and then across languages in the case of interpretation

(Gorman & Gillam, 2003; Yavas & Goldstein, 1998). The bilingual speaker must attend to both phonological systems and to vacillate between them depending on his/her communication task and his/her communication partner. As with phonological patterns, it is now thought that PA skills transfer from one language to another (Durgunoglu, 1993, Scarpino et.al, 2011).

Phonological awareness is a process that allows a language learner to consciously reflect on and manipulate the syllables and sounds of a language (Gorman & Gillam, 2003, p.13). Phonological awareness develops with exposure to the sounds and sound patterns of a language. It is thought to relate to early reading ability since the capacity to reflect on the phonological structure of a word, or sound, helps establish the link between a spoken word and its written counterpart (Gillon, 2004). Therefore, reflecting on phonology precedes orthographic awareness; it provides a mental framework for the introduction of written language to match existing concepts of sound and sound patterns.

For English speakers, the sequence and development of phonological awareness skills is well researched; it supports the idea that children first learn to manipulate words at the syllable level, then *onset* (initial sound of a word) and *rime* (remaining vowel and consonant) levels, and finally at the level of the individual phoneme (Anthony, Williams, Durán, Gillam, Liang, Aghara, Swank, Assel & Landry, 2011). Although less research has been published concerning the PA skill development of bilingual language learners, current studies support a similar pattern of PA skill acquisition for English/Spanish language learners. Both English and Spanish speaking children demonstrate an increased ability to detect rhyme before individual phonemes and with increased ability to segment and blend at the syllable level than the phonemic level (Anthony et.al, 2011; Cisero &

Royer, 1995; Durgunoglu, 1993). The more refined the phonological unit becomes, the more difficult the task (Culatta et.al, 2006, p. 68).

The differences in the phonological skill development "vary depending on the more salient phonological aspects of a language" (Stewart, 2004, p.34). Denton, Hasbrouck, Weaver and Riccio (2000) suggest that because of the regularity and predictability of the syllable in Spanish, it may be a more important unit of phonological awareness than it is in English (p.339). Another important consideration between English and Spanish is the concept of onset-rime, which assumes a CVC syllable shape by its very definition. It would therefore be remiss to assume that a Spanish language learner's PA skills will include the manipulation of an infrequent syllable shape. Vernon and Ferreiro (1999) argue that "sensitivity shown by English-speaking subjects to onset and rime may not be as prevalent among speakers of other languages" (p. 329). However, phonological awareness skills from L1 are thought to transfer to L2 (Cárdenas-Hagan et.al, 2007). Treatments designed to increase PA skills in L1 have the effect of also increasing the PA skills in L2 (Swanson, Hodson & Schommer-Aikins, 2005). In addition, phonological awareness skills in Spanish and English have been found to predict English word reading (Quiroga, Lemos-Britton, Mostafapour, Abbott & Berninger, 2001, p. 98). Measuring PA skills is important for understanding how monolingual and bilingual language learners process phonological information, and how, in the bilingual language learner, PA skills in L1 compare to those in L2. Those skills are assessed with a series of language tasks.

Phonological Awareness Tasks

Specific language tasks can be used for both measuring PA skill development and

for teaching phonological awareness. PA task such as *rhyming, blending* and *segmenting*

are supported by current research as valid means of assessing PA skills (Culatta et.al,

2006; Stewart, 2004; Swank et. al, 2011). Proceeding from the idea that each language

has its own unique phonological aspects, how young language learners complete PA

tasks will necessarily be affected by those aspects. Stress, syllable shape and phonemic

differences contribute to each language's salient phonological cues and are too the

features to which young language learners attune. Looking first at *rhyming* then *blending*

and finally *segmenting*, (sequentially acquired in both Spanish and English), we will

analyze the effect of the prominent and/or competing phonological cues.

Rhyming

   Rhyming ability is correlated with reading ability in kindergarten but becomes a

less reliable predictor in first grade and older, as more refined PA skills are acquired

(Carillo, 1994; Gorman & Gilliam, 2003). The conceptual prevalence of rhyme varies

between Spanish and English. Since the canonical syllable shape in Spanish is CV and

English is CVC, the occurrence of a consonant in the final position is not as common in

Spanish. Most Spanish words terminate with the vowels /o/ or /a/. As discussed before,

only the consonants /d, j, l, n, r, s, and z/ are found in this position (Gorman & Gilliam,

2003). Although rhyme exists as a concept in Spanish, it is not a familiar task for

Spanish speakers (Culatta et. al, 2006). As a stress-timed language, English has variable

syllable lengths containing "intrasyllabic onset + rime", rhyming is a "more salient form

of word play for English speaking children but not for their Spanish-speaking

counterparts" (Culatta et. al, 2006, p.68). Perhaps, because Spanish is a syllable-timed

language, the language as a whole is inherently rhythmic and the explicit use of rhyme is

unnecessary or redundant.

Further evidence suggests that a language's internal rhythm is perceptible to infants long before they produce language, and so rhyming tasks in an L2 are exceptionally challenging (Gillon, 2004). As established earlier, an infant can distinguish American English from a language belonging to a different rhythm class based on prosodic cues (Bunta & Ingram, 2007; Gillon, 2004). As infants learn the sounds of their first language(s), they also learn to discriminate between linguistic patterns of their language(s).

Following from our understanding of phonological interference, it seems natural that an English rhyming task would be a challenge for a Spanish speaker. First, Spanish speakers learning English experience interference from the phonotactic constraint in Spanish, which allows only a few consonants to be in the final phoneme position (Gorman & Gilliam, 2003, p.19). Secondly, Spanish speakers learning English experience the interference of the phonotactic constraint in Spanish which most syllables end in either /o/ or /a/, which can have the effect of a 'final consonant deletion' phonological pattern. Because of these phonotactic constraints, formal assessments should be constructed according to each language's phonological rules; therefore, translating rhyming tasks from English to Spanish or the reverse is an invalid measure.

Blending

Hierarchically, blending is thought to be a more challenging phonological awareness skill than rhyming because it requires attention to smaller linguistic units (Anthony et.al, 2011). Blending refers to a child's ability to combine individual sounds or syllables to create a word (Whitehurst & Lonigan, 1998). The importance of this skill

is seen even in literate adults who use blending techniques when learning to say and read new words. Therefore, it is natural that "blending sounds reflects the abstract nature of reading and is related to a child's later ability to decode printed words" (Catts, 1991).

In accordance with the established hierarchy of PA skills, blending phonemes into words appears to be a more difficult task than blending syllables into words in Spanish (Gorman & Gillam, 2003). Data collected by Paulson and Moats (2010) supports this difference, indicating that monolingual English-speaking children combine a sequence of syllables to produce words between the ages of 3 and 4 years; and between the ages of 4 and 5 years, children learn to combine isolated sounds to produce words (p.60). Little research has been published concerning how the phonological features of each language affect the results of blending tasks in both English and Spanish speaking children.

Segmenting

Segmenting is a phonological awareness skill that is the opposite of blending and begins to develop in the preschool years (Anthony et. al, 2011). English speaking children learn to isolate words in sentences (I – like – candy.), then syllables (mon – key), onset and rime units (f – ish), and then individual phonemes (f – i – sh). Gorman (2006) echoes "syllable segmentation of monosyllabic and polysyllabic words is an age appropriate task for children as young as preschool-age" (p.19).

The National Reading Panel (2001) identified "phonemic awareness and letter knowledge as the two best school-entry predictors of how well children will learn to read during their first two years in school" (ch.2, p.1). Phonemic segmentation is the most refined PA skill and represents this predictive indicator of literacy learning. Studies have shown that by the first grade "performance on segmenting tasks separated good readers

from average and poor readers" whereas performance on less refined phonological awareness tasks such as rhyme detection no longer separated good readers from poor readers" (Denton et. al, 2004, p.339). Gillon (2004) relates the study of Lieberman et. al (1974) who found that by then end of first grade 90% of the children had mastered syllable segmenting tasks and only 70% had mastered phoneme-segmenting tasks. Little research has been published concerning how the phonological features of each language affect the results of segmenting tasks in both English and Spanish speaking children.

Summary

The fast-growing population of English/Spanish speaking bilinguals is invariably exposed to more phonological information than their monolingual counterparts. This suggests an increased capacity to reflect on language sounds and structures, both within and across languages. Phonological awareness is positively correlated with early reading skills. However, English/Spanish bilinguals consistently demonstrate reduced reading scores over their English only speaking peers. Looking to the phonological awareness task of segmenting, research seeks to uncover the relationship of PA skill development and early reading ability in both the bilingual and monolingual child. Differences in segmenting ability may reflect the differences in phonological structure of the languages, or, they may hint at something else, such as, a cultural value or educational disparity, factors which are otherwise outside of the realm of this study. Here, the objective is to contribute to the growing body of research concerning the bilingual (English/Spanish) child and his/her phonological awareness development. Since PA tasks can be both diagnostic indicators *and* means of instruction, the purpose here is not to uncover a cause for the difference in reading ability, but to explore the differences so that future research

may identify ways to support the early reading skills equally, for both the bilingual and

monolingual populations.

Chapter 3: METHODOLOGY

This present study focused on the segmenting skills, a subset of phonological awareness, in bilingual English/Spanish speaking 4-and 5-year-old children. The children's skills were assessed in both English and Spanish at the segmenting levels of *syllable*, *onset-rime* and *phoneme*. These results were compared to a monolingual, English speaking group of children, of the same ages who also lived in the same community. The results were compared between the bilingual versus monolingual in the three levels of segmenting. Analysis of both groups was conducted to determine differences in segmenting abilities between the participants who were 4.0 to 4.5 years of age, 4.5 to 5.0 years of age and 5.0 to 5.5 years of age. Lastly, the bilingual group's segmenting scores were analyzed for differences in segmenting abilities between the languages, English and Spanish, in the three levels of segmentation, *syllable*, *onset-rime* and *phoneme*. The following section outlines the rationale of the segmenting tasks, the data collecting procedures and the findings of the study as related to the research questions.

Bilingual Participants

The bilingual participants in this study ranged in age from 4.0 years to 5.5 years. The gender distribution of the 31 bilingual participants included 18 females and 13 males. The participants were selected from two preschool classes in a local Spanish immersion school. All participants were English speakers learning Spanish. Most participants were considered to be *sequential bilinguals* but some families (3/31; approximately 9%) reported Spanish spoken daily in the home, consistent with *simultaneous* bilingualism. Receptive language exposure was determined by collating an inventory of all of the

people with whom the child spends time and what language/s those caregiver's speak in

the child's presence. Expressive language skills were determined by parent/caregiver and

teacher report of the child's facility in verbal communication in both English and

Spanish. All of the participants were considered to be typically developing. None of the

children were currently enrolled in kindergarten nor had any formal instruction in

phonological awareness skills, namely segmenting.

In the case of the bilingual participants, the children were chosen selectively

based on age and language use in both English and Spanish. The community from which

the participants were selected has a small number of bilingual speakers precluding the

option of random selection.

Monolingual Participants

The monolingual participants, with whom the bilingual participants' segmenting

scores are compared, shared key features with their bilingual counterparts. All

monolingual participants were 4.0 to 5.5 years of age. They attended childcare facilities

in the same community as the bilingual participants prior to attending kindergarten. In the

case of the monolingual group, the participants were selected randomly. Rationale for

random sampling includes the premise that within a specified sample, results will likely

generalize (Gall, Borg, and Gall, 1996; Paulson, 2004). Eight facilities were included in

the study, two were center based and six were home-like settings. In all 80 children were

included in the study, 39 who were 4 years of age and 41 who were 5 years of age. Both

the 4-year-old group and the 5-year-old group had a near even distribution of females and

males (22 girls and 17 boys for the 4-year olds and 22 girls and 19 boys for the 5-year-old

group). Of this larger sample, 31 monolingual participants' scores were chosen for

comparative analysis to the bilingual participant's scores by how closely they were matched in age and by gender. For neither the bilingual, nor the monolingual participants, was racial or ethnic identity information obtained and therefore it was not used as a measure of similarity or dissimilarity between the groups.

As with the bilingual participants, all monolingual participants were considered to be typically developing as reported by the children's guardians and caregivers. The monolingual participants learned English as a first language and it was the exclusive language of instruction in the childcare facilities. None of the monolingual participants had been instructed in phonological awareness.

Informed Consent

In both groups, parents and/or guardians of the participants signed the consent form to participate in the study. The University of Montana Institutional Review Board for human subject protection approved the consent forms, (see Appendices A, B). Socioeconomic status or status of citizenship information was not obtained and therefore had no bearing on the inclusionary or the exclusionary criteria for the participants.

Recruitment

Early childhood educators distributed flyers to parents in English and Spanish outlining the criteria for their child's participation as well as basic information about how long the tasks were expected to last, (see Appendices C, D). In addition, the primary researcher met with the early childhood educators as well as the school's principal to provide education concerning the nature and objective of the study. The educators were then able to distribute the information and containing contact information of the researchers to answer any questions.

Parent and Teacher Surveys

The parent/guardian survey consisted of three sections, (see Appendices E, F). The first section gathered information about the child's development and the second section addressed the child's language skill by gathering data about exposure and practice time. The final section focused on speech development that could potentially identify a speech delay and/or disorder. The researchers collected most of this information prior to the study; however, some parents/guardians mailed the survey to the researchers after the data collection was completed. The background survey was modeled after previously developed questionnaires (Gildersleeve, 2010; Restrepo, 1998).

The information gathered via teacher report included impressions of the children's demeanor and how the researchers could build rapport with each participant. In addition, the teachers shared general information about the class curricula and language expectations. It was related that Spanish is the preferred language of the classrooms; all formal and informal instruction is provided in the language and the students are encouraged to use their Spanish skills at all times. The teachers also identified the students who use Spanish in the home environment, information that was corroborated with the parent/guardian survey. The teachers who participated in this study reported that phonological awareness skills were not a part of the curricula nor were they discretely taught as a part of a lesson or incidentally instructed during play or leisure activities.

Setting

This study was conducted at a language immersion school in the Northwest region of the United States. Preschool to first grade students were taught all subjects entirely in

Spanish. The model of language immersion at this institution was predicated on implicit

instruction and exposure in Spanish versus explicit instruction. Implicit instruction

appeals to a developmental model of language acquisition whereby young language

learners gain and understand language by seeing, hearing, and learning it in their natural

environment (Tedick et.al, 2011). The students are 'immersed' in the language rather

than it being an addition to their curricula.

Admission into the school follows the principles of 'good practice for admissions'

as outlined by the National Association of Independent Schools, determined by school

visits, family interviews, admissions assessments and academic and social

recommendations. Per the school's website, priority of admission is given to currently

enrolled students and their siblings. International applicants are encouraged to apply.

Although the institution is primarily funded by students' tuition costs (80%),

supplemental expenses are met by donation. The school also has financial aid programs

and scholarships intended to provide educational access to a socioeconomically diverse

group. Applicants are not selected based on their financial solvency alone.

Theoretical Basis of Stimuli

The Spanish words selected for the segmenting tasks relate to the English words

in the these ways: adapted from psychometrically valid assessments of phonological

development appropriate for the target age group, word structure similarity and number

of syllables in *syllable* segmenting category.

No consonant clusters were used in any of the Spanish test items as another

control for the phonotactic constraints. As cited in Gorman and Gillam, (2003) consonant

clusters occur in only 3.59% of Spanish words. Although among some of the shared

phonemes in Spanish and English there exists acoustical-perceptual differences (i.e.

aspirated vs. unaspirated /p/ and /t/); the current study is not concerned with articulation,

only phonological awareness. No measures were taken to record productions, since

accuracy of production is not relevant to the study.

The English stimuli in this study were identical to the English stimuli in a

previous study (Paulson, 2004), for a measure of reliability between groups. The English

stimuli were common words familiar to young children adapted from the *Phonological*

Awareness Test (PAT) (Robertson & Salter, 1997). The Spanish words selected for the

comparative analysis were adapted from formal assessments similar to those selected by

the Paulson study. The PA tasks designed for the bilingual study were drawn from four

sources: the *Assessment of Phonological Processes-Spanish* (Hodson, 1985), the

Compton Speech and Language Screening Evaluation: Spanish Adaptation (Compton &

Kline, 1983), *Indicadores Dinámicos del Éxito en la Lectura*[TM] 7ª Ed. [1] (IDEL) (Good,

Baker & Watson, 2006), and the *Preschool Language Scale 4th Ed Spanish* (Zimmerman

et.al, 2002).

The differences between the word lists in the onset-rime and phoneme categories

were controlled by the phonotactic constraints of each language. The onset-rime category

in Spanish was modified from CVC to CVCV to afford a more meaningful unit of

analysis. The adaptation from CVC to CVCV also afforded maintenance of linguistic

familiarity across languages. At the phoneme level, more words with two phonemes were

used in the English stimuli since many two-phoneme words in Spanish are pronouns and

prepositions and therefore are not categorically related to the English stimuli. Lastly, the

omission of consonant clusters in the Spanish items adhered to the measure of frequency and familiarity important for both word sets.

The English stimuli and the Spanish stimuli are also related to each other by semantic category. All of the stimuli are familiar to young language learners; they are food items, body parts, animals and other common environmental objects (i.e. star, tree).

Test Protocol Development

The segmenting tasks included 10 items and two trial items for each linguistic level: syllable, onset and rime, and phoneme. In total, there were 30 test items for each language for a total of 60 segmenting tasks. At each level of segmenting, the English stimuli were closely matched to the Spanish stimuli by the number of linguistic units by which to be segmented.

Task 1. In the syllable category, in both English and Spanish, four words contain two syllables, three words contain three syllables and three words contain four syllables.

Task 2. In the onset and rime category, all English stimuli mirrored the CVC patterns and the Spanish stimuli CVCV.

Task 3. In the phoneme category, three of the English stimuli contained two phonemes and seven contained three phonemes. In the Spanish stimuli one word contained two phonemes and the remaining nine words contained three phonemes.

The researchers sought to investigate the difference in segmenting ability of monolingual English speaking children and bilingual (English/Spanish) speaking children, using an identical English word list, to reduce the variability in the study across groups. The Spanish word list was created with attention to phonotactic constraints of the language (see above). Colorful pictures bound into 'flipbooks' provided visual cues

for the words in the segmenting tasks, and the examiners used puppets to model the

segmenting tasks during the trials. Denton (2000) cites the use of puppets as an

appropriate way to model segmenting and blending tasks to young language learners

(p.347).

Data Collection Procedures

The segmenting tasks were administered in quiet corners of the habitual

classroom environment, with minimal visual and auditory distractions. Data collection

occurred during normal school hours. The length of testing time was dependent on the

skill level of each student ranging from approximately five to fifteen minutes.

The examiners in this study were students pursuing advanced degrees in speech-

language pathology. The examiners were also proficient Spanish communicators. Dr.

Lucy Hart Paulson supervised the task administration. All examiners were provided

training for task administration including a script from which they agreed to read

verbatim to increase procedural reliability, see (Appendix G). Two training sessions

were held prior to the study and outside of the study's location. Before the examiners

participated in a 10 item test intended to measure their segmenting detection skills,

education was provided to the examiners concerning the levels of segmenting (syllable,

onset-rime and phoneme) and salient differences between English and Spanish. As

current students of speech-language pathology these were familiar concepts. Inter-rater

reliability was established through scoring agreement across examiners for a participant's

segmenting ability at a level of 90%. The primary researcher in the bilingual study

calculated the reliability by scoring 10 test items administered to the examiners in the

training sessions.

Task Directions

At the beginning of each session a few minutes were used to establish rapport between the examiner and participant. During this time the puppets used for task instruction (*Ellie the Elephant* in English and *Rámon la Rana* in Spanish) were introduced to the participants individually. The examiner explained which language each puppet used and how they segmented words using analogy (slow and plodding like an elephant and hopping on lily pads like a frog). The examiner then modeled the target words using the puppet and then had the child use the puppet to segment the same item to ensure task familiarity. For each category, there were two trial items, with corrective feedback; re-administration was provided to ensure the students' comprehension of task instructions. In each category there were 10 task items for which no corrective feedback was provided for a total of 30 test items in English and 30 items in Spanish. Incorrect segmentation productions were marked with a 0 and correct productions are marked with a +, see (Appendix H). Testing was discontinued in each category in the cases of 5 consecutive incorrect responses. Only 1 participant in the bilingual group completed all of the segmenting tasks in both English and Spanish. The total items correctly segmented in each category were recorded out of the 10 items possible. Examiners recorded any instances of participant assent or environmental disturbance, see (Appendix I).

All data were collected within a two-week period in two sessions. The first testing session took place in the 4-and 5-year old classroom area. Two testing cites were established, one on the inside of the classroom and the other just outside the door of the classroom. The supervisor was able to oversee and to overhear the task administration from one location. The teacher assistant and the researcher escorted the children to the

testing locations two at a time based on the child's availability. To minimize class

distraction, the children were called to participate during free periods or play periods and

not during activities such as 'circle time' or from recess.

The second testing session took place in the 3-and 4-year-old classroom. This

time a table in the back of the classroom, separated by a privacy curtain, was used during

task administration. A large divider was placed on the table to increase the privacy of the

testing stations. The supervisor was able to see and hear the task administration from an

optimal vantage point in the room. In addition, the primary researcher watched over the

examiners' task administration. Again, the children were not asked to participate during

structured activities.

Average testing time per child lasted approximately 10 minutes per child. The

researcher collected the data recording forms immediately following the task

administration. The scores were recorded by the task administrators and then checked for

accuracy by the primary researcher. The data collected from only one potential

participant was eliminated from analysis due in part to the student's limited responses

during testing but also the student's multilingual background (at least 3 other languages

beside English and Spanish spoken in the home per guardian report).

Research Design and Statistical Procedures

Inferential statistics were carried out using R, an open source software program

used for data analysis and graphic generation. Descriptive statistics were calculated from

the results of the three levels of segmenting tasks in both English and Spanish. Mean,

standard deviation, median, upper and lower quartiles were calculated for each group

based on segmenting ability (bilingual and monolingual) and age. From the descriptive

data, inferential tests were run to determine the relationships between groups, more specifically, to test the null hypothesis that the population means were equal. To evaluate the relationship of age and segmenting ability, a two-way analysis of variance, or a 2-way ANOVA for each segmenting task *syllable*, *onset-rime* and *phoneme* was performed. Post hoc analysis multiple comparison procedure used to determine which means of ages are significantly different from one another following the two-way ANOVA. For comparing the bilingual only group in their segmenting skills in Spanish and English, a paired t-test was used. A 95% confidence interval was used in each inferential procedure. The results of the segmenting tasks for the bilingual participants and the comparative analysis between the bilingual and monolingual groups are outlined in the following section.

Chapter 4: RESULTS & DISCUSSION

The results of this study, concerning the ability of bilingual English/Spanish speaking subjects to segment versus monolingual English speaking subjects in the categories (*syllables, onset-rime* and *phonemes*) mirror the three research questions as follows: the bilingual versus monolingual at each level of segmenting, the relationship of age and segmenting ability and finally the bilingual group's ability to segment across languages. Results of the bilingual versus monolingual, in each level of segmenting, while also considering age, were evaluated with a two-way ANOVA. Three different ANOVAs were completed, one for each language and each level of segmenting. Results indicated a statistically significant difference for the bilingual group versus the monolingual group in the raw segmenting scores at the onset-rime and phoneme levels with English stimuli. The differences identified indicated that the bilingual group demonstrated an increased segmenting ability over the monolingual group. Below, Figure 1 displays distributions of the segmenting scores separated by the bilingual versus monolingual whole groups at each level of segmenting.
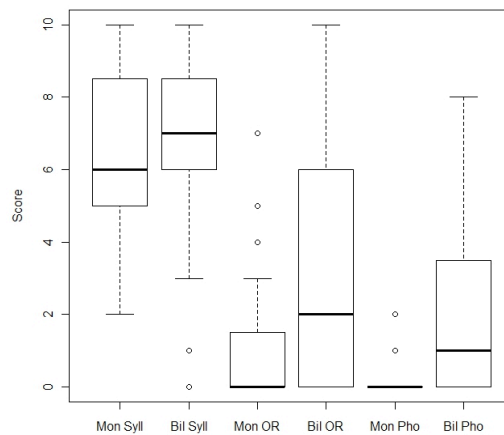
Figure 1. The bilingual and monolingual whole groups by segmenting tasks at syllable,

onset-rime and phoneme levels.

Figures 2, 3 and 4 show the bilingual versus monolingual groups by segmenting

task (syllable, onset-rime, phoneme) and by age (4.0 to 4.5, 4.5 to 5.0, 5.0 to 5.5 years).

Syllable Score for Both Schools by Age

Figure 2. The bilingual and monolingual groups in segmenting tasks at syllable level by

age (4.0 to 4.5, 4.5 to 5 and 5 to 5.5 years).

Onset/Rime Score for Both Schools by Age

Figure 3. The bilingual and monolingual groups in segmenting tasks at the onset-rime

level by age (4.0 to 4.5, 4.5 to 5.0, 5.0 to 5.5 years).

Figure 4. The bilingual and monolingual groups in segmenting tasks at the phoneme

level by age (4.0 to 4.5, 4.5 to 5.0, 5.0 to 5.5 years).

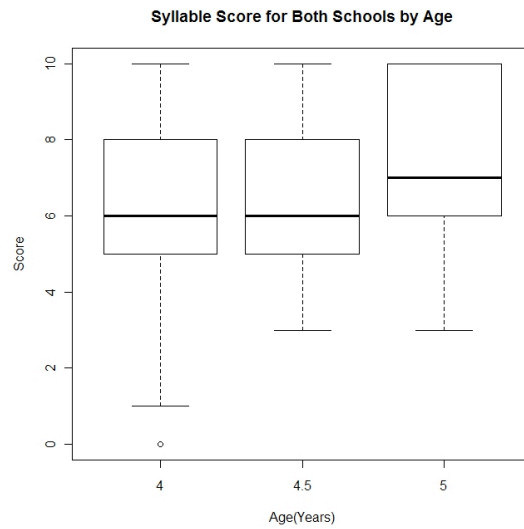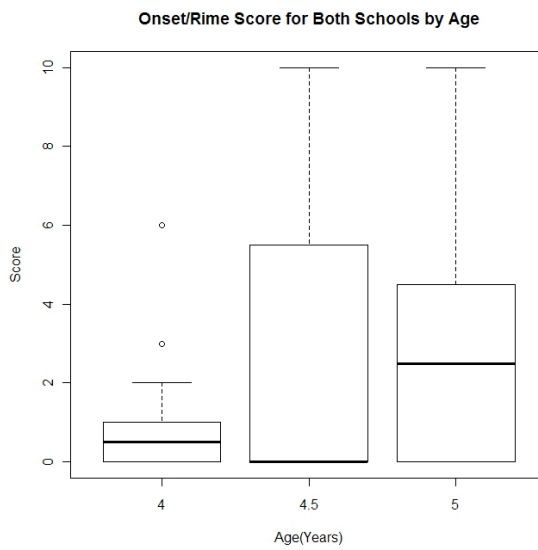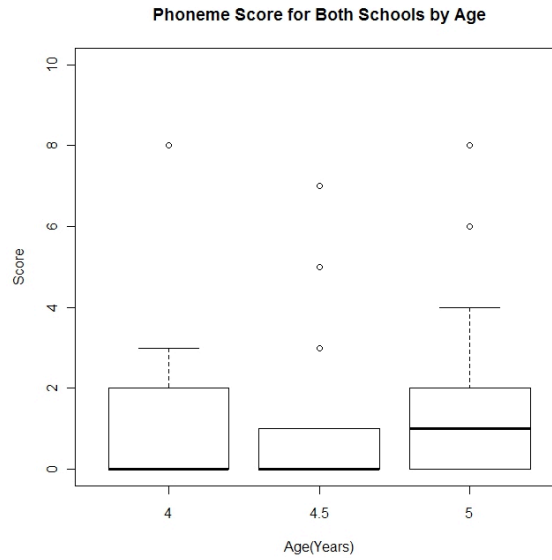The results from the two-way ANOVA are displayed in Table 1 below.

Table 1

The Two-Way Analysis of Variance of the bilingual and monolingual groups for each

segmenting task at the syllable, onset-rime and phoneme levels by age.

(Bilingual and Monolingual student groups and ages)

Level	Dependent Variable	Df	Sum Sq	Mean Sq	F value	Pr(>F)	-
Syllables (E)							
	Language	1	1.613	1.6129	.3142	0.57737	
	Age	2	39.727	19.8637	3.8691	0.02667*	
	Language: Age	2	8.837	4.4185	0.8607	0.42840	
Onset-rime (E)							
	Language	1	81.31	81.306	9.9321	0.002608**	
	Age	2	46.73	23.364	2.8541	0.066017	
	Language: Age	2	17.42	8.712	1.0642	0.351865	
Phonemes (E)							
	Language	1	52.403	52.403	13.5009	0.0005349**	
	Age	2	2.213	1.106	0.2850	0.7530784	
	Language: Age	2	3.394	1.697	0.4372	0.6480229	

*p<.01. **<.001. M=monolingual B=bilingual

The language variable had a p-value of 0.5774 for syllable, 0.0026 for onset-rime, and .0005 for phonemes. Corresponding 95% confidence intervals for the difference in average scores between bilingual students and English (only) students were -0.830 to 1.47, 0.834 to 3.746, and 0.836 to 2.841 respectively. This means, for example, we are 95% confident that bilingual students have an average onset-rime score, which is .834 to 3.746 points greater than for monolingual students. Note that there was no evidence of a difference between the average syllable scores but strong evidence of average phoneme scores for bilingual students are greater than for English only students.

Supporting what we see in the boxplots, there is little evidence of a difference in mean segmenting scores across age groups by six month intervals. For the syllable

scores, however, the Age variable had a p-value of .027. The post-hoc analysis for this

variable found that there was moderate evidence of a difference in average scores

between 4- and 5-year-olds. However, when the unusual scores of 0 and 1 (for 4-year-

olds) were eliminated, the p-value for a two-sample T-test was 0.082, since t-test are

sensitive to outliers with small sample sizes such as the bilingual group in this study

(Kirk, 2008, p.292).

The researchers were also interested in comparing the total language scores

between the bilingual and monolingual groups. Looking at the boxplot in Figure 5, there

is a clear tendency for bilingual students to have a higher total segmenting score than

monolingual students. This finding lends itself nicely to the theory of increased

metalinguistic ability and phonological awareness in the student learning more than one

language as a natural consequence of increased exposure to language sounds and

structures (Durgunoglu, 1993, Scarpino et. al, 2011).

Furthermore, comparing the two groups with a two-sample t-test, the p-value of

.018 supports this observation by giving us moderate evidence that the average total score

for bilingual students is greater than the average total score for monolingual students.

The corresponding 95% confidence interval suggests that the bilingual average is .46 to

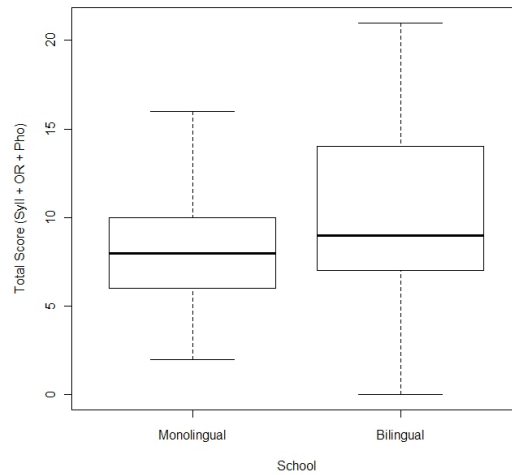4.77 points higher than for monolingual students in Figure 5:

Figure 5. The bilingual versus monolingual whole groups composite scores for all segmenting tasks in English.

Students were matched across groups (Bilingual and Monolingual) by gender. There is an identical distribution of female and male subjects in each group. No statistically significant difference was found in performance between female and male subjects within either subject group or across groups. See Table1. Although this finding does not pertain to a specific research question in this study, it is relevant insofar that the monolingual segmenting scores (Paulson, 2004) indicated no difference between male and female groups, which is consistent with the findings in the bilingual group.

Table 2

Age and gender distribution of the participants in the bilingual and monolingual groups.

Years	4.0-4.5 years	4.5-5.0 years	5.0-5.5years	Sum	female/male
Monolingual	9	10	12	31	18/13
Bilingual	9	10	12	31	18/13
Sum	18	20	24	62	62

Since there is moderate evidence of a difference between the mean syllable score across age, additional analysis was required to determine where this difference was observed. Tukey's HSD (honestly significant difference) is a post hoc analysis multiple comparison procedure used to determine which means are significantly different from one another following ANOVA. The p-value for the difference between the mean score for 5-year-olds and mean score for 4-year-olds was .0237. The corresponding 95% confidence interval for the difference in average scores is .215 to 3.617. We are 95% confident that 5-year-old children will score on average .215-3.617 points higher than 4-year-old children in syllable segmenting tasks. See Table 3.

Table 3

The difference of mean ages and performance on segmenting tasks at the syllable level, for bilingual and monolingual groups using Tukey's HSD.

Age	difference	lower	upper	p adj
4.0-4.5	0.7166	-1.055	2.488	0.5964
4.5-5.0	1.2000	-0.4516	2.8516	0.19623
4.0-5.0	1.916667	0.21574	3.6175	0.02366

To address the final research question, regarding bilingual subjects segmenting ability in both English and Spanish for each segmenting task *syllable, onset-rime* and *phoneme,* a paired t-test and constructed a 95% confidence interval was conducted. No evidence of a mean difference was revealed in the *syllable* segmenting tasks English versus Spanish (t=-0.262, df=30, p-value=0.795), with a confidence interval of -1.134 to 0.876. Results indicated statistically significant difference (increased ability) in the *onset-rime* segmenting tasks English versus Spanish (t=4.6327, df=30, p-value=. 00007),

confidence interval 1.677 to 4.323. This means that we are 95% confident that bilingual

students score on average of 1.677 to 4.323 points higher on the English *onset-rime* test

than they do on the Spanish *onset-rime* test items. This strong result makes sense since

only 3 students scored above 0 on the Spanish *onset-rime* tasks. With the *phoneme*

segmenting tasks, there exists some evidence of a difference with a p-value of .043 and

confidence interval 0.025 to 1.393 See Figure 6:

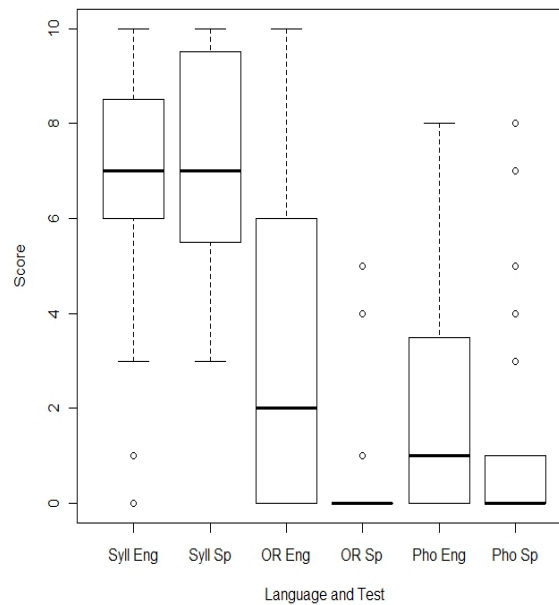*Figure 6.* The bilingual group's segmenting scores at the syllable, onset-rime and

phoneme levels in both English and Spanish.

Research Question Summary

The primary research question posed in this study is, *what are the segmenting abilities of*

English/Spanish bilingual children who are 4 and 5 years old? Please see Discussion and

Implications section for a summary of results.

Subsidiary questions:

1. With English only stimuli, is there a difference in the segmenting abilities of bilingual (English/Spanish speaking) 4-and 5-year-old children to monolingual (English speaking) 4-and 5-year-old children in the segmenting tasks at the *syllable, onset-rime* and *phoneme* levels?

    1a. 2-way Anova results show that there is no evidence or statistically significant difference in the means of the bilingual and monolingual groups in the segmenting tasks at the syllable level (Figure 2).

    1b. 2-way Anova results show that there *is* evidence, a statistically significant difference, in the means of the bilingual and monolingual groups in the segmenting tasks at the onset-rime level (Figure 3). The bilingual participants demonstrated an increased ability to detect and produce segments at the onset-rime level with the English stimuli.

    1c. 2-way Anova results show that there *is* evidence, a statistically significant difference, in the means of the bilingual and monolingual groups in the segmenting tasks at the phoneme level (Figure 4). The bilingual participants demonstrated an increased ability to detect and produce segments at the phoneme level with the English stimuli.

2. With English only stimuli, is there a difference in the segmenting abilities (English) for bilingual English/Spanish speakers and monolingual English speakers between 4.0-4.5 years old, 4.5-5.0 years old and 5.0-5.5 years old?

    2a. 2 –way ANOVA for each test shows that there is some evidence of a difference in the means of the of the age groups of both populations in the segmenting tasks at the syllable levels in English (Table 1). Post Hoc analysis

with Tukey's HSD shows a statistically significant difference in the mean scores of the 4-year olds to the 5-year-olds in *syllable* segmenting (English) (Table 3).

2b. 2 –way ANOVA for each test shows that there is no evidence of a difference in the means of the of the age groups of both populations in the segmenting tasks at the onset-rime level in English (Table 1).

2c. 2 –way ANOVA for each test shows that there is no evidence of a difference in the means of the of the age groups of both populations in the segmenting tasks at the onset-rime and phoneme levels in English (Table 1).

3. With English and Spanish stimuli, is there a difference between English segmenting abilities and Spanish segmenting abilities for bilingual children, age 4.0 years to 5.0 years, in the categories of *syllable, onset-rime* and *phoneme* between the languages?

3a. Paired t-test results show no evidence of a mean difference between English and Spanish in the segmenting tasks at the syllable level (Figure 6).

3b. Paired t-test results show very strong evidence of mean difference between English and Spanish in the segmenting tasks at the onset-rime level, which is statistically significant (Figure 6).

3c. Paired t-test results show some evidence of a mean difference between English and Spanish in the segmenting tasks at the phoneme level, which is not statistically significant (Figure 6).

Discussion and Implications

The data collected and analysed in this study serves the purpose of uncovering the relationship between dual language acquisition and phonological awareness development, a predictor of early reading. In evaluating the scores of each group in each level of

segmenting we find some similarities and some differences. The following section outlines those similarities and differences, which provides a basis from which the implications of these results might be useful in supporting PA skill development and subsequently early reading abiltiy.

The bilingual group demonstrated a greater mean score in both English and Spanish in the segmenting tasks of *onset-rime* and *phonemes,* compared to the monolingual group. No statistically significant difference was found in the *syllable* category. While onset-rime is a less relevant concept in Spanish because of its syllable shape and stress pattern (Scarpino et. al, 2011), it was better identified and produced by the bilingual group. A possible contributing factor for this result is an increased phonological awareness in the bilingual group. Because bilinguals manipulate linguistic information from one language to the next, it could be the case that they also have increased *metalinguistic* ability, or, an increased ability to consiously reflect on language. However, no difference was found between the groups when their composite segmenting skills were analysed.

When comparing the composite segmenting scores of both groups by age (4 years of age and 5 years of age) a statistically significant difference was found in the segmenting abilities at the syllable level between the 4–year-old and the 5-year-old participants. This supports the idea that with age and development correlates positively with phonolgical awareness in both English and Spanish (Dickinson, 2004). With post hoc analysis, no statistically significant difference was found between the age groups of 6 month intervals, nor was a there a statistically significant difference between the other segmenting tasks, at the onset-rime and phoneme levels.

The bilingual group demonstrated no statistically significant difference between English and Spanish segmenting abilities at the *syllable* level, and some evidence of a difference at the *phoneme* level. There is however, a difference in the *onset-rime* category. Subjects in this group demonstrated an increased ability to detect and to produce onset-rime segments in English. In fact, the mean and median of the *onset-rime* scores in Spanish are both 0, although there are 3 outliers. This coheres nicely with the phonological rules of Spanish because onset-rime is not a significant linguistic unit in the language (Gorman & Gillam, 2003, p.15). As mentioned earlier, *onset-rime* is not a relevant linguistic unit in Spanish. The bilingual group also demonstrated an incresaed segmenting ability of *onset-rime* in English compared to the monolingual group. Even though the linguistic element of *onset-rime* is not significant for Spanish speakers (Gorman & Gillam, 2003, p.15), the bilingual group more readily identifies it than the English only group. This contributes to the idea that there is a correlation between learning multiple languages an increased metalinguistic ability and likewise a higher level of phonological awareness (Durgunoglu, 1993, Scarpino et. al, 2011).

While these results indicate some evidence of a difference between the bilingual and monolingual groups in segmenting ability, they do not provide a clear indication of reasons for decreased reading ability in the bilingual language learner and they only hint to the idea that bilingualism positively relates to increased MPA. However, there is some suggestion that phonological structure of a language informs performance on PA tasks. Future research is warranted to investigate the multi-dimensional relationships between bilingualism, monolingualism, age and development, phonological awareness and early reading skills. Some of the potential factors of influence not considered in this study such

as, cultural and familial value of language both spoken and written, may be the keys to provide greater insight into this complex issue. Specific limitations of this study are outlined in the following section.

Limitations of the Study

The findings of the current study are a relevant contribution to understanding bilingual phonolgical awareness development; however, broad conclusions cannot be extrapolated from the data considering some of the limitations of the study. One of these limitations includes level and type of bilingualism reported by the participants' parents and guardians. The background survey information and teacher report indicated that all participants in this study (both groups) speak primarily English in the home. Although 9.06% of the bilingual group or 3/31 participants report speaking Spanish regularly in the home, no particians in the study reported speaking exclusively Spanish in the home. The results of the bilingual participants in the segmenting tasks more closely reflects sequential bilinguals and not simultaneous bilinguals. They also represent a minority subset of English/Spanish bilinguals, those who speak primarily English in the home environment and Spanish in the educational environment. Again, this subset does not represent the larger, more widely researched bilingual population, who learn Spanish in the home environment and English at school.

In addition, information regarding socioeconomic status (SES) information was not collected for this study. Low SES is identified by the National Reading Panel as a risk factor of poor reading outcomes (2000) (Scarpino et. al, 2011). The website for the Spanish immersion school that participated in this study indicates that tuition is used for the school's basic operation, presumably at a substantial cost. It also indicates that

financial assistance and scholarships are available. Therefore, it is difficult to determine the financial backgrounds of the subjects' families based on enrollment in the school. The participants in the monolingual group were enrolled in a paid child care setting but again no measures were taken to confirm the socioeconomic status of each participant's family. Thus, while SES is a potential factor for performance on the results of this study, as it is a risk factor for poor reading outcomes (NRP, 2000), these data were not collected regarding the participants in this study and therefore remains a limitation of the study in determining the differences in segmenting ability among the participants.

Lastly, very little research has been conducted concerning the phonological awareness of bilingual English/Spanish children *and* very little research has been conducted with the subset of bilingual children who learn English in the home and acquire Spanish language skills at school, within the immersion model. Comparative analysis to previous research was unavailable at the time of this study.

Future research in these areas is warranted to better understand the phonological awareness skills in these groups. A related area of interest might include how bilingual children are scored in PA tasks with regard to normative data; do they more closely follow the of development for the monolingual English, or monolingual Spanish speaker? This rapidly growing bilingual population suggests a need for reinventing traditional, monolingual methods of assessment and support.

Future Directions

Several variables were considered for measuring and comparing the PA skillls of the monolingual and bilingual participants in this study. The students were matched according to age and gender. No participant was identified as having a speech or

language disorder. All participants lived in the same community and participated in similar early childhood educational experiences without explicit instruction in phonolgical awareness skills. However, there are factors which were not considered that could be relevant in uncovering similarities and dissimilarities between the groups. These considerations, in the areas of paticipant selection, protocol development and method of analysis, could also be relevant for future research.

For example, racial and ethnic identity was not considered in this study. The monolingual participants were selected by random sampling whereas the bilingual particiants were selected by convenience sampling due to the limited number of bilingual students in the community. The present study identified only language use as a variable to distinguish groups and not racial, ethnic or cultural information.

Secondly, the Spanish stimuli in the testing protocol used to measure the bilingual participants segmenting skills reflected the English stimuli in its levels of segmentiation. Since onset-rime is not a relevant linguistic segment in Spanish, perhaps a more salient unit of segmenting could be used to measure segmenting ability such as first sound detection or alliteration. In addition, the Spanish stimuli at the syllable level reflected the English stimuli in the number of syllables (between 2 and 4), perhaps 5 and 6 syllable words could be used in the Spanish stimuli to reflect frequently ocurring length of common words inthat language. In addition, since the bilingual participants' segmenting skills were measured in both languages, and the monolingual participants were measured in only English, a nonsense word task could be included to gauge the pure segementing ability, based phonological awareness and not familiarity.

Finally, the analysis could include the segmenting scores of Spanish only monolingual speakers compared to bilingual English/Spanish speakers to determine if the increased segmenting ability of the bilinguals over the monolingual English speakers was a true value or rather a reflection of *sequential* English/Spanish bilingualism. Yet another interesting comparison would be *simultaneous* English/Spanish bilingual students segmenting scores versus *sequential* English/Spanish bilingual students segmenting scores, to investigate the relationship of how bilingualism is achieved, and its impact on PA skill development in both languages.

In future research, there is clearly a need to include more participants who represent the many types of monolingual (English and Spanish) and bilingual English/Spanish (sequential and simultaneous) students. Collecting this data will help to amass the normative data necessary for designing approrpiate assessment tools and treatment programs for the growing number of bilingual English/Spanish students in this country.

Conclusion

This study attempted to uncover potential differences between bilingual English/Spanish and monolingual English speaking populations of the same ages, 4 and 5 years of age, in phonological awareness development, specifically segmenting ability. The bilingual group demonstrated some increased segmenting abilities in specific tasks but no overall difference was established between the groups. However, the difference in abilities can be important because phonological awareness is now widely accepted as a predictor of early literacy skills (Gillon, 2004) and bi/multilingual speakers are thought to have increased metalinguistic skills which is linked to phonological awareness

(Durgunoglu, 1993; Scarpino et. al, 2011). Therefore, children acquiring more than one language should have better reading abilities than their monolingual peers. However, children from Spanish-speaking homes are consistently identified as having decreased reading abilities compared to English only students (Ayre et.al, 2010, p. 298). Many other variables may also account for this discrepency, such as, exposure to English in the home, exposure to written language, socioeconomic status, and cultural values, to name only a few. In addition, race and ethnicity were not considered in this study but perhaps these are important variables. Other potential reasons for the difference in reading ability might be inadequate assessment tools and literacy development programs, which were designed for monolingual students, without consideration of home language experience.

Some private facilities, such as language immersion schools, are actively exploring bilingualism and its benefits, educational and otherwise. The public U.S. education system however, continues to struggle in supporting its fast growing, Spanish and English speaking students. As we learn more about phonoloigcal awareness, its positive realtionship with early reading ability, and how it develops in bi/multilingual speakers, we will discover new ways to support early reading. Increased reading ability even has some social justice implications; for example, a Spanish-speaking family living in this country, English reading skills will be important for finding work, housing, understanding regulations as well as for novel socializing events like boardgames.

Educators and speech-language pathologists can facilitate early literacy development by supporting phonological awareness skill development. The information that we obtain regarding bi/multilingual language acquisition and its relationship to

phonological awareness will be invaluable in the future to accommodate demographic

changes in the U.S. schools and in the professional efforts to promote literacy.

References

Anthony, J., & Francis, D. (2005). Development of phonological awareness. *American Psychological Society*, *14* (5), 255-258.

Anthony, J., Williams, J., Durán, L., Gillam, S., Liang, L., Aghara, R., Swank, P., Assel, M., & Landry, S. (2011). Spanish phonological awareness: Dimensionality and sequence of development during the preschool and kindergarten years. *Journal of Educational Psychology*, *103* (4), 857-876. doi: 10.1037/a0025024

Ayer, A., Haynes, C., Hook, P., & Macaruso, P. (2010). Predictors of english reading skills in spanish-speaking english-language learners (SpELLs). *Selected Proceedings of the 12th Hispanic Linguistics Symposium*, pp. 298-311.

Brice, G., & Brice, A. (2009). Investigation of phonemic awareness and phonic skills in spanish-english bilingual and english-speaking kindergarten students. *Communication Disorders Quarterly*, *30* (4), 208-225.

Bunta, F., & Ingram, D. (2007). The acquisition of speech rhythm by bilingual spanish- and english-speaking 4- and 5-year-old children. *Journal of Speech, Language, and Hearing Research*, *50*(4), 999-1014. doi:10.1044/1092-4388(2007/070)

Cardenas-Hagan, E., Carlson, C. D., & Pollard-Durodola, S. D. (2007). The cross-linguistic transfer of early literacy skills: The role of initial L1 and L2 skills and language of instruction. *Language, Speech, and Hearing Services in Schools*, *38*(3), 249-259. doi:10.1044/0161-1461(2007/026)

Culatta, B., Aslett, R., Fife, M., & Setzer, L. A. (2004). Project SEEL. *Communication Disorders Quarterly*, *25*(2), 79-88. doi:10.1177/15257401040250020501

Culatta, B., Reese, M., & Setzer, L. A. (2006b). Early literacy instruction in a dual-language
(spanish—english) kindergarten. *Communication Disorders Quarterly*, *27*(2), 67 -82.
doi:10.1177/15257401060270020501

Denton, C., Hasbrouck, J., Weaver, L., & Riccio, C. (2000). What do we know about
phonological awareness in spanish?, *Reading Psychology, 21*, 335-352.

Dickinson, D., McCabe, A., Clark-Chiarelli, N., & Wolf, A., (2004). Cross-language transfer
of phonological awareness in low-income spanish and english bilingual preschool
children, *Applied Psycholinguistics, 25*, 323-347.

Durgunoglu, A.Y., (2002). Cross-linguistic transfer in literacy development and implications
for language learners, *Annals of Dyslexia*, *52*, 189-201.

Gildersleeve-Neumann, C. E., Kester, E. S., Davis, B. L., & Pena, E. D. (2008). English
speech sound development in preschool-aged children from bilingual english-spanish
environments. *American Speech Language Hearing Association*, *39*, 314-328.
doi:10.1044/0161-1461(2008/030)

Gillon, G. (2004). *Phonological awareness: from research to practice.* New York, New York:
The Guilford Press.

Goldstein, B. A., & Iglesias, A. (1996). Phonological patterns in normally developing spanish-
speaking 3- and 4-year-olds of puerto rican descent. *Language, Speech, and Hearing
Services in Schools*, *27*(1), 82-90. Retrieved from
http://lshss.asha.org/cgi/content/abstract/27/1/82.

Goldstein, B. A., & Iglesias, A. (2001). The effect of dialect on phonological analysis:
evidence from spanish-speaking children. *American Journal of Speech-Language
Pathology*, *10*(4), 394-406. doi:10.1044/1058-0360(2001/034

Goldstein, B., & Washington, P. S. (2001b). An initial investigation of phonological patterns

    in typically developing 4-year-old spanish-english bilingual children. *Language, Speech,*

    and Hearing Services in Schools, *32*(3), 153-164. doi:10.1044/0161-1461(2001/014)

Goldstein, B. (2004). *Bilingual Language Development & Disorders in Spanish-English*

    Speakers. Baltimore, Maryland: Paul H. Brooks Publishing Co.

Goldstein, B. A., Fabiano, L., & Washington, P. S. (2005). Phonological skills in

    predominantly english-speaking, predominantly spanish-speaking, and spanish-english

    bilingual children. *Language, Speech, and Hearing Services in Schools*, *36*(3), 201-218.

    doi:10.1044/0161-1461(2005/021)

Gorman, B. K., & Gillam, R. B. (2003). Phonological awareness in spanish. *Communication*

    Disorders Quarterly, *25*(1), 13 -22. doi:10.1177/15257401030250010301

Hammer, C. S., Farkas, G., & Maczuga, S. (2010). The language and literacy development of

    head start children: a study using the family and child experiences survey database.

    Language, Speech, and Hearing Services in Schools, *41*(1), 70-83. doi:10.1044/0161-

    1461(2009/08-0050)

Hammer, C. S., Miccio, A. W., & Wagstaff, D. A. (2003). Home literacy experiences and their

    relationship to bilingual preschoolers' developing english literacy abilities: an initial

    investigation. *Language, Speech, and Hearing Services in Schools*, *34* (1), 20-30.

    doi:10.1044/0161-1461(2003/003)

Kirk, R.E. (2008). *Statistics an introduction Fifth edition*. Belmont, CA: Thompson

    Corporation

Paulson, L.H. (2005). The development of phonological awareness skills in preschool

    children: From syllables to phonemes. *Dissertation Abstracts International*, (University

    Microfilms No. 3166292)

Paulson, L. H., & Moats, L. (2010). *LETRS for early childhood educators.* Longmont, CO: Cambium Learning Sopris West.

Quiroga, T., Lemos-Britton, Z., Mostafapour, E. Abbot, R., & Berninger, V. (2001). Phonological awareness and beginning reading in spanish-speaking esl first graders: Research into practice. *Journal of School Psychology, 40*, 88-111.

Ruscello, D. (2008). *Treating articulation and phonological disorders in children.* St. Louis, MO: Mosby, INC.

Scarpino. S., Lawerence, F., Davison, M., & Hammer, C. (2011). Predicting bilingual spanish-english children's phonological awareness abilities from their preschool english and spanish oral language. *Journal of Research in Reading, 34* (1), 77-93. doi: 10.1111/j.1467-9817.2010.01488

Snow, C., Burns, S., & Griffin P. (1998). *Preventing reading difficulties in young children.* Washington D.C.: National Academy Press.

Stewart, M. R. (2004). Phonological awareness and bilingual preschoolers: Should we teach it and, if so, how? *Early Childhood Education Journal, 32* (1). doi: 1082-3301/04/0800-0031/0

Swanson, T. J., Hodson, B. W., & Schommer-Aikins, M. (2005). An examination of phonological awareness treatment outcomes for seventh-grade poor readers from a bilingual community. *Language, Speech, and Hearing Services in Schools, 36*(4), 336-345. doi:10.1044/0161-1461(2005/033)

Tedick, D., Christian, D., & Williams Fortune, T. (2011). *Immersion education: practices, policies, possibilities bilingual education and bilingualism.* Towanda, NY: Multilingual Matters.

Vernon, S., & Ferreiro, E. (1999). Writing development: a neglected variable in the

consideration of phonological awareness. *Harvard Educational Review*, *69* (4), 395-416.

Yavas, M., & Goldstein, B. (1998). Phonological assessment and treatment of bilingual

speakers. *American Journal of Speech-Language Pathology*, *7*(2), 49-60. Retrieved from

http://ajslp.asha.org/cgi/content/abstract/7/2/49.

Appendices

APPENDIX A

Informed Consent Form IRB Approved

The University of **Montana**

Informed Consent for Parents/Guardians

BE PART OF AN IMPORTANT PROJECT

Early Literacy Skills (Segmenting) in Spanish/English Bilingual Children: 4 -and 5-year-olds

Kate McKay, a graduate student in the department of Communicative Sciences and Disorders at The University of Montana, is conducting a study to learn more about the early literacy skills of 4- and 5-year-olds before they begin kindergarten. You and your child were selected as possible participants in the study because your child is the correct age and has been learning both Spanish and English.

If I agree to Participate, What Will I Have To Do?
If you decide to take part in this project,

- You will be asked to complete a questionnaire about the language and developmental history of your child.
- These documents will be provided to you in both English and Spanish and they can be read to you as well, based on your preference.
- It should take about 10 minutes to complete the survey.

What Is The Study About?

- We want to measure an aspect of early literacy skill development in children with bilingual language backgrounds in Spanish and English.
- We will learn about your child's skill development by showing him/her pictures then asking him/her to identify the word and word parts of the picture with the help of a fun puppet friend.
- The word tasks will be in both Spanish and English.
- The data will be collected in one session taking approximately 20 minutes in the Spring of 2012.

What Are We Doing To Protect Your Privacy?
Your privacy is very important to us, and we will ensure that:

- All information obtained during this study that can be linked to your identity will be kept CONFIDENTIAL.
- Only the researcher and teachers will have the names of the participants. Each subject will be given coded number to protect his or her identity.

- Information collected from participants will be used for research purposes ONLY.

What If I Have Questions?

- If you have any concerns about your participation in this study, or your rights as a human subject, please contact the Institutional Review Board, University Hall 116, The University of Montana, Missoula, Montana 59812, (406) 243-6672.

- If you have questions about the study itself, please contact Kate McKay by email at mailto:kate.mckay@umconnect.umt.edu, or by mail at Communicative Sciences and Disorders 32 Campus Dr. Missoula, MT 59812 or by phone (406) 529-8539.

Why Do I Sign This Form?
This is a consent form. Your signature below means that:

- You have read this form, or it has been read to you, and you understand what it means.
- You and your child are willing to take part in the study.
- You know that you do not have to take part in the study.
- You can change your mind at any time.
- You will get a copy of this form to keep for yourself.

Thank you,

Kate McKay, TEFL
Graduate Student
Communicative Sciences and Disorders
The University of Montana
(406) 529-8539

Dr. Lucy Hart Paulson
Faculty Advisor, Department Chair
Communicative Sciences and Disorders
The University of Montana
(406) 243-2376

I, _____, give my consent for my child to participate in the study "Early Literacy Skills (Segmenting) in Spanish/English Children: 4-and 5-year-olds".

Child's Name: _____

Child's Birthdate: _____

Parent or Guardian Signature: _____

Date: _____

APPENDIX B

Informed Consent Form-Spanish

Phyllis J. Washington
College of Education and Human Sciences
Communicative Sciences and Disorders
RiteCare Speech Language Hearing Clinic
32 Campus Drive
Missoula, MT 59812-6695

CSD Office: (406) 243-2363
Clinic Office: (406) 243-2405
Fax: (406) 243-2362

Consentimiento Informado Para Los Padres/Cuidadores

SER PARTE DE UN PROYECTO IMPORTANTE

Alfabetización Temprana en los Niños Bilingües Español/Inglés: 4 y 5 Años

Un estudiante graduado del departamento de Ciencias de Trastornos Comunicactivos, en la Universidad de Montana, está realizando un estudio para saber más sobre la alfabetización temprana de los niños con 4 y 5-años, antes de comenzar a preescolar. Usted y su hijo/a fueron seleccionados como posibles participantes en el estudio porque su hijo/a tiene la edad correcta y ha sido expuesto al Español e Inglés.

<u>Si estoy de acuerdo en participar, ¿Qué tendré que hacer?</u>
Si decide participar en este proyecto,

 • Se le pedirá completar un cuestionario sobre la historia del desarrollo de lenguaje(s) de su hijo/a

 • Estos documentos se prestará a usted en Español e Inglés, o un investigador/a puedan leerse a usted, basado en su preferencia

 • Esto debería durar 10 minutos

<u>¿Qué es el estudio?</u>
• Queremos medir un aspecto del desarrollo de habilidades al respeto al alfabetización temprana en niños/as con fondos de lenguaje bilingüe (Español e Inglés)
 • Vamos a aprender sobre el desarrollo de habilidades de su hijo/a al respeto de la alfabetización. Con la ayuda de un títere amigo, le mostrarémos dibujos a su hijo/a para solicitar algunas palabra y partes de las palabras
• Palabras será en Español y la otra serie será en Inglés.
• Los datos se recogerán en una sola session y llevará aproximadamente 20 minutos en la primavera de 2012
<u>¿Qué están haciendo para proteger nuestra privacidad?</u>

Su privacidad es muy importante para nosotros, y garantizamos que:

• Toda la información obtenida durante este estudio y que puede vincularse a su identidad se mantendrá confidencial.

• Sólo el investigador y los profesores tendrán los nombres de los participantes.

• Información recopilada de los participantes se utilizará sólo con fines de investigación.

¿Qué sucede si tengo preguntas?
• Si tiene alguna duda acerca de su participación en este estudio, o sus derechos como un sujeto humano, póngase en contacto con la Institutional Review Board, University Hall 116, The University of Montana, Missoula, Montana 59812, (406) 243-6672.
• Si usted tiene preguntas sobre el estudio de sí mismo, póngase en contacto con Kate McKay por correo electrónico a kate.mckay@umconnect.umt.edu o por correo a Communicative Sciences and Disorders 32 Campus Dr. Missoula, MT 59812 o por telefono (406) 529-8539.

¿Por qué firmar este formulario?
Se trata de un formulario de consentimiento. Su firma abajo significa que:
• Ha leído este formulario o se ha leído a usted y usted entiende lo que significa

• Usted y su hijo/a están dispuestos a estar parte en el estudio.

• Sabe que no tiene que estar parte en el estudio.

• Puede cambiar de opinión en cualquier momento.

 • Usted recibirá una copia de este formulario para mantener por sí mismo.

Sinceramente,

Kate McKay   Dr. Lucy Hart Paulson
Graduate Student, TEFL   Faculty Advisor, Department Chair
Communicative Sciences and Disorders   Communicative Sciences and Disorders
The University of Montana   The University of Montana
(406) 529-8539   (406) 243-2376

Yo, _____, doy consento de que mi hijo/hija participa en el estudio "Early Literacy Skill Development of Segmenting in Spanish/English 4- and 5-Year-Old Children".
   Nombre de Hijo/a: _____

   Cumpleanos de Hijo/a: _____

   Firma de Padre o Cuidadero/a: _____

APPENDIX C

Flyer-English

Fecha: _____

February 2012

Dear Parents and Caregivers,

Thank you so much for agreeing to allow your child to participate in the study on Early Literacy Skills in English and Spanish. I think it will be a fun experience for your child, and it helps us to understand more about how bilingual children acquire reading skills needed to become good readers!

Attached is a survey about your child's use of language(s), so we can better understand when he/she uses Spanish and when he/she uses English. Please complete the forms and return them in the attached envelope to your child's teacher. The forms are provided in both Spanish and English and can be read to you as well, depending on your preference. We will call you in the next week or so to se if you have any questions or concerns about the survey.

Once we have collected the background information, we can begin the study! The tasks in the study are fun, language-based tasks that will be presented using picture cards and even some fun friends (puppets)! The tasks will take no more than 20 minutes to complete and will be done in your child's natural learning environment.

Thank you for your support and participation. Please call me at (406-529-8539) or email me at kate.mckay@umontana.edu if you have questions.

Sincerely,

Kate McKay, BA Spanish, TEFL

Graduate Student Speech-Language Pathology
Department of Communicative Sciences and Disorders
University of Montana-Missoula

APPENDIX D

Flyer-Spanish

Phyllis J. Washington
College of Education and Human Sciences
Communicative Sciences and Disorders
RiteCare Speech Language Hearing Clinic
32 Campus Drive
Missoula, MT 59812-6695

CSD Office: (406) 243-2363
Clinic Office: (406) 243-2405
Fax: (406) 243-2362

Febrero de 2011

Estimados Padres y Cuidadores,

Gracias por tanto de acuerdo permitir a su niño a participar en el estudio sobre la alfabetización temprana en inglés y español. Creo que será una divertida experiencia para su hijo/a, y nos ayuda a entender más acerca de los niños bilingües cómo adquirir las habilidades necesarias para convertirse en buenos lectores!

Adjunta es una encuesta sobre el uso de su hijo de idioma (s), por lo que podemos comprender mejor cuando usa en español y cuando utiliza el inglés. Por favor completar los formularios y devolverlos en el sobre adjunto al maestro de su hijo. Las formas se ofrecen en español e inglés y pueden leerse a usted así, dependiendo de su preferencia. Te llamaremos en la semana que viene o así para ver si tiene alguna pregunta o inquietud acerca de la encuesta.

Cuando hemos recopilado la información de fondo, podemos empezar el estudio! Las tareas en el estudio son tareas divertidas, basada en el lenguaje que se presentarán mediante tarjetas picture y diversión (marionetas) amigos! Las tareas llevará aproximadamente 20 minutos para completar y va hacer en un espacio tranquilo en el medio ambiente natural de aprendizaje de su hijo.

Gracias por su apoyo y participación. Por favor me llame al (406-529-8539) o mandame un correo electrónico a kate.mckay@umontana.edu si tiene preguntas.

Sinceramente,

Kate McKay, BA Spanish, TEFL

Graduate Student Speech-Language Pathology
Department of Communicative Sciences and Disorders
University of Montana-Missoula

APPENDIX E

Parent/Guardian Survey-English

The University of Montana

Background Information: Parent/Caregiver Survey

Child's Name:_____   **Child's Teacher's Name**_____

Your Name:_____   **Your Relationship to the Child:**_____

Section 1: DEVELOPMENT HISTORY

1. What is your child's birthdate?

2. What languages do the child's parents speak?

3. How old was your child when he/she first babbled? (e.g. bababa or dadada)

4. How old was your child when he/she spoke his/her first word? What was it?

5. How old was your child when he/she combined words into sentences?

6. Has your child ever had his/her hearing checked? What were the results?

7. Has your child ever been treated for ear infections? If yes, how many times? When?

8. Has your child ever been seriously ill or hospitalized? If yes, please explain.

9.   Does your child have any medical conditions?

10. Who are the members of your child's family? Please note ages of brothers and sisters.

11. With whom does your child interact the most?

12. Do you have any concerns about your child's development? If yes, what are they?

Section 2: LANGUAGE DEVELOPMENT
The questions below help us understand your child's language development and usage, in both Spanish and English.

1. Approximately how many hours per week <u>outside of school</u> is your child exposed to Spanish?

2. Approximately how many hours per week <u>outside of school</u> is your child exposed to English?

3. Using the table below, who does your child spend time with and what languages do they speak around your child?

PLEASE COMPLETE THE TABLE BELOW

Person/Relationship	Number hours/day with Child	Language Spoken to Child
Mother		
Father		
Siblings		
Babysitter		
Other Relatives		
Teacher		
Other		
Other		

Section 3: SPEECH DEVELOPMENT
PLEASE CIRLCLE ONE FOR EACH QUESTION.

1. Is your child's pronunciation difficult to understand?
     Never   Rarely   Sometimes   Frequently   Never

2. Does your child have difficulty pronouncing words/sounds?
     Never   Rarely   Sometimes   Frequently   Never

3. Does your child *leave out* certain sounds when he/she speaks? (e.g. star→ ar)
     Never   Rarely   Sometimes   Frequently   Never
4. Does your child *change* sounds when she speaks? (e.g. rock→wock)
     Never   Rarely   Sometimes   Frequently   Never

5. Is your child frustrated when he/she speaks?
     Never   Rarely   Sometimes   Frequently   Never

6. In comparison to other children his/her age, do you think the child is developing normally?

Bilingual Level: Parent/Guardian Survey

Section 4: BILINGUAL LEVEL
PLEASE CIRLCLE ONE FOR EACH QUESTION.

1. How well does your child understand Spanish?
     1-A few words
     2-A little of what is said
     3-A lot of what is said
     4-All or almost all of what is said

2. How well does your child understand English?
     1-A few words
     2-A little of what is said
     3-A lot of what is said
     4-All or almost all of what is said

3. How well does your child speak English?
     1- Child uses a few words.
     2- Child uses some words and phrases
     3- Child uses English with many grammatical errors and limited vocabulary
     4- Child speaks but with some grammatical errors and moderate vocabulary
     5- Child speaks the language like a native speaker with very few grammatical errors and a good vocabulary

4. How well does your child speak Spanish?
     1- Child uses a few words.
     2- Child uses some words and phrases
     3- Child speaks grammatical errors and limited vocabulary
     4- Child speaks the language but with some grammatical errors and moderate vocabulary
     5- Child speaks the language like a native speaker with very few grammatical errors and a good vocabulary

5. How often does your child speak English?
     1-Never
     2-A little
     3-Sometimes
     4-Most of the time
     5-All of the time

6. How often does your child speak Spanish?
     1-Never
     2-A little
     3-Sometimes
     4-Most of the time
     5-All of the time

7. How often does your child hear English?
     1-Never
     2-A little
     3-Sometimes
     4-Most of the time
     5-All of the time

8. How often does your child hear Spanish?
     1-Never
     2-A little
     3-Sometimes
     4-Most of the time
     5-All of the time

APPENDIX F

Parent/Guardian Survey-Spanish

Antecedentes: Encuesta para Padres y Cuidaderos

Por favor complete este formulario y devolverlo al me, Kate McKay, a través de maestro de su hijo. Gracias por tu ayuda!

Nombre del niño: _____ Nombre del maestro del niño: _____
Su nombre: _____ Su relación con el niño: _____

Sección 1: historia del desarrollo

1. ¿Cuál es la fecha de nacimiento de su hijo?

2. ¿En qué idiomas hablan los padres del niño?

3. ¿Cuántos años fue su hijo cuando babbled primero? (por ejemplo, bababa o dadada)

4. ¿Cuántos años fue su hijo cuando éste hablaba su primera palabra? ¿Qué fue?

5. ¿Cuántos años fue su hijo cuando habló de sus primeras sentencias?

6. ¿Ha tenido su hijo su audiencia marcada? ¿Cuáles fueron los resultados?

7. ¿Se su hijo nunca ha tratado de infecciones en el oído? ¿En caso afirmativo, cuántas veces? ¿Cuando?

8. ¿Ha su hijo nunca sido gravemente enfermo o hospitalizados? En caso afirmativo, sírvase explicar.

9. ¿Su hijo tiene cualquier condición médica?

10. ¿Quiénes son los miembros de la familia de su hijo? Tenga en cuenta las edades de los hermanos y hermanas.

11. ¿Con quien su hijo interactúa más?
12. ¿Tiene alguna duda sobre el desarrollo de su hijo? En caso afirmativo, ¿qué son?

Antecedentes: Encuesta de Padres/Cuidadores

Sección 2: encuesta de lenguaje

Las siguientes preguntas nos ayudan a comprender el uso y desarrollo de lenguaje, en Español e Inglés de su hijo/a.

1. ¿ Aproximadamente cuántas horas esta su hijo/a expuesto al Español cada semana ?
(fuera de la escuela)
2. ¿ Aproximadamente cuántas horas esta su hijo/a expuesto al Inglés cada semana ?
(fuera de la escuela)
3. ¿Con quien su hijo pase tiempo con? ¿Qué idiomas hablan alrededor de su hijo?

POR FAVOR COMPLETE LA SIGUIENTE TABLA

Número de persona/relación	Horas del día con niño/a	Idioma hablada al niño/a
Madre		
Padre		
Hermanos		
Niñeras		
Otros Parientes		
Profesor		
Otros		
Otros		

Nivel bilingüe: Encuesta de Padres/Cuidaderos

Preguntas 1-8: Nivel Bilingüe

1. ¿Qué tan bien su niño/a entender al Español?

1-A pocas palabras

2-A poco de lo que se dice

3-Mucho de lo que se dice

4-Casi todo

2. ¿Qué tan bien su niño entender al Inglés?

1-A pocas palabras

2-A poco de lo que se dice

3-Mucho de lo que se dice

4-Casi todo

3. ¿Qué tan bien su hijo/a habla el Español?

1 - El niño utiliza unas palabras.

2 - El niño utiliza algunas palabras y frases

3 - El/La niño/a utiliza el Español con muchos errores gramaticales y con vocabulario limitado

4 - El/La niño/a habla el idioma pero con algunos errores gramaticales y vocabulario moderado

5 - El/La niño/a habla la lengua como un hablante nativo

4. ¿Qué tan bien su hijo/a habla el Inglés?

1 - El niño utiliza unas palabras.

2 - El niño utiliza algunas palabras y frases

3 - El/La niño/a habla el Inglés pero con errores gramaticales y vocabulario limitado

4 - El niño/a habla el idioma pero con algunos errores gramaticales y vocabulario moderado

5 - El niño/a habla la lengua como un hablante nativo

5. ¿Con qué frecuencia su hijo/a habla Inglés?

1 Nunca

2 A poco

3 A veces más

4 La mayoría de tiempo

5 Todo el tiempo

6. ¿Con qué frecuencia su hijo/a habla el Español?

1 Nunca

2 A poco

3 A veces más

4 La mayoría de tiempo

5 Todo el tiempo

7. ¿Con qué frecuencia escuchar su hijo/a la Inglés?

1 Nunca

2 A poco

3 A veces más

4 La mayoría de tiempo

5 Todo el tiempo

8. ¿Con qué frecuencia escuchar su hijo/a la Española?

1 Nunca

2 A poco

3 A veces

4 La mayoría de tiempo

5 Todo el tiempo

APPENDIX G

Scripted Instructions

Phyllis J. Washington
College of Education and Human Sciences
Communicative Sciences and Disorders
RiteCare Speech Language Hearing Clinic
32 Campus Drive
Missoula, MT 59812-6695

CSD Office: (406) 243-2363
Clinic Office: (406) 243-2405
Fax: (406) 243-2362

March 2012

Early Literacy Skills (Segmenting) in Spanish/English Bilingual Children: 4 -and 5-year-olds

Thank you so much for assisting in this study. We are interested in knowing more about phonological awareness and young children who speak both Spanish and English. There are two important parts in gathering the data: a survey for the parents and a segmenting task for the children.

Surveys
In order for the children to participate in the study, we need a signed consent from their Parents or Guardians. Consent forms are included in this packet. Also included is a survey to gather the needed background information regarding the children's language development and exposure from the families. The survey is available in both English and Spanish. In these documents, we outline the plan of confidentiality as well as the general procedures of the study. Parents and Guardians are encouraged to contact the primary researchers at any time. When we finalize the dates that the tasks will be administered, a plan for distributing the consent forms will be developed (either at a participant meeting or sent home with students to be returned).

Packets

The materials included in the packet include:

- instructions for administering and scoring the segmenting tasks
- recording forms including an examiner comment section
- picture stimulus flip books for Spanish and English
- and puppets (Ellie the Elephant and Ramon la Rana)

Tasks
The phonological awareness task in this study is segmenting and includes syllables (*can – dy),* onset/rime units (the first sound and the rest of the word *i.e. s - un),* and phonemes (the individual sounds in a word *i.e. c-a-t).* Each of these 3 levels of segmenting will be measured in both languages. Each level includes 2 trial items with corrective feedback and 10 items. The segmenting tasks should take about 10 minutes.

The segmenting task should take place in a quiet, well-lit environment with minimal distractions. A script is provided for you to provide a level of standardization in the task administration. If the child segments the word correctly, mark a checkmark + on the recording form next to the target

word. If the child segments the word incorrectly, mark an 0 on the recording form next to the target word.

Syllable		Onset-Rime		Phoneme	
1. pizza	+	fish	+	pie	0

An important thing to remember is that phonological awareness is about the syllables and sounds in words and NOT the letters. (For example, in the word 'ship', the beginning sound 'sh' is only one phoneme even though it has two letters.)

Script:

Set 1: Segmenting English Words (Syllable, Onset-Rime, Phoneme)

Syllable
Say to the child, *"Hi we are going to play with some words. This is Ellie Elephant* (show the stick puppet to the child). *She is going to help us today. She moves very slowly and talks very slowly. I want you to help Ellie say the word for these pictures. Here is the first one, here is a picture of candy and here is how Ellie says it, 'can - dy'* (separating the syllables). *Now it is your turn,* (give the child the elephant puppet) y*ou have Ellie say 'candy'."* Have the child say the syllables of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the syllable category. Discontinue after 5 continuous errors.

Onset/Rime
For the onset/rime items, say to the child, "*Now we are going to have Ellie say the words in another way. She is going to say the first sound and then the rest of the word, like this, 'sss - un'. Now it is your turn,* (give the child the elephant puppet) *you have Ellie say 'sun' with the first sound and the rest of the word."* Have the child say the onset/rime components of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the onset/rime category. Discontinue after 5 continuous errors.

Phoneme
For the phoneme items, say to the child, "*Now we are going to have Ellie say the words in another way, again. She is going to say each sound in the word, like this, 'e - gg'. Now it is your turn,* (give the child the elephant puppet) *you have Ellie say 'sun'."* Have the child say the sounds of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the phoneme category. Discontinue after 5 continuous errors.

Script:
Set 2: Segmenting Spanish Words (Syllable, Onset-Rime, Phoneme)

Syllable
Say to the child, *"Hi we are going to play with some words. This is Ramon la Rana* (show the stick puppet to the child). *He is going to help us today. He moves by hopping from one lily to the other. I want you to help Ramon say the word for these pictures. Here is the first one, here is a picture of the moon and here is how Ramon says it, 'lu-na'* (separating the syllables). *Now it is your turn,* (give the child the frog puppet) y*ou have Ramon say 'luna'."* Have the child say the syllables of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the syllable category. Discontinue after 5 continuous errors.

Onset/Rime
For the onset/rime items, say to the child, *"Now we are going to have Ramon say the words in another way. He is going to say the first sound and then the rest of the word, like this, 'c - asa'. Now it is your turn,* (give the child the frog puppet) *you have Ramon say 'casa' with the first sound and the rest of the word."* Have the child say the onset/rime components of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the onset/rime category. Discontinue after 5 continuous errors.

Phoneme
For the phoneme items, say to the child, *"Now we are going to have Ramon say the words in another way, again. He is going to say each sound in the word, like this, 's - a – l '. Now it is your turn,* (give the child the frog puppet) *you have Ramon say 'sal'."* Have the child say the sounds of the word. Provide corrective feedback if necessary to insure that the child understands the directions. Continue with the second trial item. Then proceed with the rest of the items in the phoneme category. Discontinue after 5 continuous errors.

Examiner Comment Form and Participant Assent:
Following the segmenting tasks, please take a moment to complete the examiner's comment form to record any important information about the testing environment and the child's behaviors during the tasks. Important behavior to record is: child's demeanor, noise level in room, child's level of participation, and use of language (i.e. Did the child use Spanish or English during the tasks in informal conversation?)

Please note that if a child is unwilling or unable to complete the tasks due to emotional or physical discomfort please terminate the tasks immediately. Please indicate on the Examiner Comment form the reason the child was unable to complete the tasks.

Please contact Kate McKay with any questions or conccerns. (406) 529-8539, kate.mckay@umconnect.umt.edu

Participant ID #_____

Date/Fecha_____

APPENDIX H

Recording Form

Segmenting Target Words: English

Syllables		Onset/Rime		Phonemes	
T1 candy		T1 sun		T1 egg	
T2 elephant		T2 pop		T2 soap	
1 pizza		fish		pie	
2 hamburger		top		shoe	
3 kangaroo		book		cow	
4 pillow		house		foot	
5 television		sock		seed	
6 umbrella		nest		bun	
7 monkey		ship		nose	
8 peanut butter		man		chip	
9 spider		chair		duck	
10 watermelon		dog		tree	
Segmenting Totals					

Segmenting Target Words: Spanish

Syllables		Onset/Rime		Phonemes	
T1 luna		T1 casa		T1 sal	
T2 estrella		T2 rana		T2 uva	
1 lápiz		yoyó		pan	
2 guitarra		boca		ojo	
3 pájaro		nube		sol	
4 taco		rata		oso	
5 escaleras		burro		pez	
6 sombrero		queso		dos	
7 gato		jugo		mar	
8 bicicleta		mano		uno	
9 vaca		sopa		té	
10 pantalones		mesa		gol	
Segmenting Totals					

APPENDIX I

Examiner Comments

Examiner Comments:

Was the child able to complete the tasks? Y/N If no, please explain.

Setting comments (e.g. noise level, interruptions)

Child's level of participation: behavior/emotions (e.g. shy, mad, other)

Did child attempt and Spanish usage during English stimuli, or English during the Spanish stimuli?

Does child appear to have a speech delay or disorder or other delay or disability?

Other Comments?