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Articulation And Phonological Systems Of Spanish-English Speaking Florida 4 And 5 Year Olds

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ARTICULATION AND PHONOLOGICAL SYSTEMS OF SPANISH-ENGLISH SPEAKING FLORIDA 4 AND 5 YEAR OLDS

by

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ABSTRACT

There are currently five million children three to five years of age (i.e., 59.5% of all children from three to five), who are bilingual, living in the United States. By 2025, Census data show that the population of Florida will increase by some 26 percent adding another 5.5 million people to the state. There are a limited amount of studies yielding data on the development of Spanish phonology in 4 and 5 year old children residing in the United States, particularly in Florida. Consequently, there is limited normative information pertaining to articulation and phonological development in Spanish speakers.

It was postulated that normal, bilingual, Spanish/ English speaking children, ages 4 to 5 years old, would display different articulation and phonological processes in English and Spanish when measured with standardized English and Spanish articulation and phonology tests.

Sixteen participants from the Orlando and Miami, Florida areas were tested. The participants consisted of eight 4 year olds and eight 5 year olds with six females and ten males. The children ranged in age from 3.7 to 5.7 with a mean age of 4.8 years. A diverse Spanish dialect (Puerto Rican, Cuban, Central American, and South American Spanish) was obtained from the participants. All children were normally developing. In addition, language, oral motor skills, and hearing were screened.

It was hypothesized that there would be differences for the group of 16 bilingual (i.e., Spanish-English speaking) children for place, manner and voicing of articulation in English versus Spanish as measured by percentage of consonants correct. Only one consonant in the initial position was significantly different, i.e., /tʃ/.

The /tʃ/ phoneme is an affricate which means it is part stop and part fricative. Spanish contains only one fricative (i.e., the /tʃ/) whereas English contains two affricates (i.e., /tʃ/, /dʒ/). Spanish speakers therefore, have little practice producing affricates.

It was hypothesized that there would be differences in the group of 16 bilingual (i.e., Spanish-English speaking) children for phonological processes as measured by percentage of occurrence errors in English versus Spanish phonology. Two of the seven phonological processes were significantly different in their comparisons: (a) Stopping; and (b) Velar Fronting. Stopping could have been more difficult for children in English (9% occurrence) than in Spanish (0% occurrence) because there are more fricatives in English which can be stopped as compared to Spanish where there is only one fricative, which could be stopped. Fronting occurred 4% of the time in English and 0% of the time in Spanish. This could be due to the Spanish language being more anteriorly placed than English (Brice, 1996).

Normative articulation and phonological Spanish data from this study were obtained and are particularly useful for speech-language pathologists in today's public school. As the Hispanic school population increase this information is beneficial as a reference for Spanish speech productions. Further research should include more participants, e.g., Spanish-English speaking children with phonological disorders, as the Hispanic population is increasing especially in the state of Florida. Larger sample sizes should be studied in order to create a more accurate valid representation of the population of Spanish-English speaking children in Florida.

Research on this topic should be expanded to include normative data for disordered bilingual children in order to apply more appropriate treatments. In addition, other languages should be studied as the state of Florida and the nation are also experiencing growth in other languages beyond Spanish.

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Normal Articulation Development

Articulation is described as the movement of the articulators required to produce speech sounds. Correct articulation production requires a multitude of systems working simultaneously to correctly articulate words. The systems essential to speech and articulation production are tongue movement, height, place and manner; lip placement; jaw movement; velopharyngeal closure; activation of the voicing mechanism; hard and soft palate shape, contour and movement (Arlt & Goodban, 1976; Hulit & Howard, 1997; Hodson & Edwards, 1997).

Normal developmental articulation is systematic and rule governed. Phonemes develop at certain ages and in a particular order. Therefore, articulation is considered to be developmental in nature.

Developmental English Articulation

A large percentage of English speech sounds are mastered by 50% of children by 4 years of age (Poole, 1934). Wellman (1931) stated that articulatory development of the majority of consonants occurs between the ages of 3 and 6. Templin (1957) concluded that the articulatory development of a child lasts until the age of seven, whereas, Arlt and Goodban (1976) concluded that articulatory development can last up until 5 years of age. The differences for ages of customary production among these studies can be attributed to the fact that the authors used different critieria for development. Poole (1934) used the criteria of 100% accuracy, while all others used a criteria of 75% accuracy.

In addition, the various authors used different stimuli, different sample sizes, geographic locations and the data were gathered over a span of 42 years.

The study by Prather, Hedrick and Kern (1975) was more lenient with age ranges and allowed several more years for the child to master each phoneme by giving age ranges, instead of fixed ages for each phoneme production.

There appears to be variance on exact ages of acquisition, however, the general age ranges are overall similar and consistent. Refer to Table 1 for an overview of the ages at which most English sounds are acquired (Arlt & Goodban, 1976; Prather, et al., 1975; Poole, 1934; Templin, 1957; Wellman, Case, Mengert, & Bradbury, 1931).

Table 1 Average Ages of Consonant Acquisition

Consonant	Wellman et al. (1931); 75% accuracy	Poole (1934); 100% accuracy	Templin (1957); 75% accuracy	Prather et al. (1975); 75%	Arlt & Goodban (1976); 75% accuracy
m	3	4.6	3	2	3
n	3	4.6	3	2	3
h	3	4.6	3	2	3
p	4	4.6	3	2	3
f	3	5.6	3	2.4	3
w	3	4.6	3	2.8	3
b	3	4.6	--	2.8	3
ŋ	--	4.6	3	2.8	3
j	4	4.6	3.6	2.4	--
k	4	4.6	4	2.4	3
g	4	4.6	4	2.4	3
l	4	6.6	6	2.4	4
d	5	4.6	4	2.4	3
t	5	4.6	6	2.8	3
s	5	7.6	4.6	3	4
r	5	7.6	4	3	5
ʧ	5	4.6	--	3.8	4
v	5	6.6	6	4	3.6
z	5	7.6	7	4	4
ʒ	6	6.6	7	4	4
θ	--	7.6	6	4	5
ʤ	--	7	4	4	--
ʃ	--	6.6	4.6	3.8	4.6
ð	--	6.6	7	4	5
ɜ	--	7.5	--	--	--

Developmental Spanish Articulation

Spanish phoneme acquisition has been generally researched, along with the use of phonological processes (Brice, 1996). The overall acquisition process is the same across the Spanish language; however, dialectical trends and variations differentiate articulation development within the Spanish language.

All dialects of a particular language are rule governed and mutually intelligible. Therefore, any dialect should be considered a change from a standard from which one can measure specific variations (Goldstein & Iglesias, 2001).

Spanish dialects differ considerably from each other with the differences characterized mainly by consonant distinctions. The consequences of not considering dialect have serious outcomes for education placement as bilingual speakers may be misidentified as having a speech-language disorder or a language based learning disability.. Spanish dialects are mainly characterized through consonant differences which affect large consonant sound classes-particularly fricatives, liquids, glides and nasals (Cotton & Sharp, 1988).

Research on Spanish articulation acquisition has been limited to a few isolated dialects. It is reported that there are six major dialects of American Spanish: (a) Mexican and Southwestern United States; (b) Central American; American; (c) Caribbean; (d) Highlandian; (e) Chilean; and Southern Paraguayan, Uruguayan; and (f) Argentinean (Cotton & Sharp, 1988). However, fricatives and liquids show greater variation by these dialectical features (Iglesias & Goldstein, 1998) than stops, glides, and affricates. Acevedo (1989) found that monolingual, Mexican American participants from south Texas, had acquired all but the following phonemes by the age of 4 years: /j/, /l/, /θ/, /t/, /s/, /r/.

Jimenez (1987) studied the articulation of Spanish speaking children (with a American Spanish dialect) from the Sacramento Valley in California and found a larger number of phonemes mastered after 4 years of age (cited in Mann, 1994). Refer to Table 2 for an overview of when most Spanish sounds are acquired.

Table 2 Age of Acquisition of Spanish Phonemes

Phonemes	Jimenez (1987); 90% accuracy	Acevedo (1989); 90%
p	3	4
b	3	4
t	3	4
k	3	4
f	3	4
j	3	4.6
w	3	4
ʧ	3	-
M	3	4
n	3	4
d	3	4
g	3.3	4
s	3.3	-
x	3.3	4
l	3.3	4.6
r	3.7	-
n	3.7	4
r	4.7	4

Normal Phonological Development

As young children develop and learn to communicate, they simplify speech production to make speaking easier. During the first 4 years of life, children evidence a number of different phonological processes.

A phonological process refers to a sound change which affects a whole class of sounds. For example, gliding is a phonological process that changes a liquid /l, r/ phoneme to a glide /w, j/. Articulation wise, production of glides is simpler (Hulit & Howard, 1997; Hodson & Edwards, 1997).

A large number of processes appear in the speech of younger children and then gradually decrease in frequency until they are virtually nonexistent (Mann, 1994). The decrease in phonological processes is evident while the child is learning the rules and structures of spoken language. The ages at which processes occur and knowledge of the different types of processes by speech-language pathologists are equally important.

Simplifications (phonological processes) are systematic and usually occur for the same sounds in all positions of occurrence within words. The consonant vowel (CV) syllable structure, from a phonological natural or universal perspective, appears in almost all languages and forms the basis of a child's first words. The normally developing child will reduce a complex syllable structure (e.g., CVCV) to a more basic consonant-vowel (CV) structure. The general developmental processes used by children in learning their first language seem to be universal, regardless of the language being acquired (Eblen, 1982). Therefore, some universal phonological process features seem to occur across languages.

No matter what language, most normally developing children use the phonological simplification processes in their preschool years. Substitution processes are sound changes in which one sound class replaces another class of sounds. That is, one sound is substituted for another, with the replacement sound usually reflecting a change in place, manner, or voicing features.

For example, the child's production of the word "toat" for the word "coat" reflects a substitution of the phoneme /t/ for /k/ and the fronting process. This change occurred at the place level. The word required a /k/ sound; instead the child used the next closest phoneme he/she knew while using the same properties of manner and voicing.

Assimilation processes represent sound changes caused by the contextual effects that certain speech sounds may exert upon one another. For example, the child produces the word "beb" for the desired word "bed". The /b/ phoneme in the initial position of the word influenced the /d/ at the final position. Another example is if the child produces the word "tat" for the desired word "cat". The child used the correct manner and voicing, but changed the placement converting the /k/ sound into a /t/ instead.

Phonological development remains a forefront research topic, because of the need to understand normal development as applied to disordered populations. In particular, speech language pathologists should have knowledge of normal growth in order to differentiate normal from disordered development when assessing and treating children's phonology. Research has implied that most phonological processes are corrected by the time the child enters kindergarten or elementary school (Hodson, 1978).

Early intervention practices have focused on assessment and treatment at the earliest opportunity to seize upon an early window of development. Early intervention requires that new phonological developmental norms reflect the development of targeted age ranges. Children typically enter preschool around 3 to 4 years of age and, consequently, may begin to be assessed and receive speech and language services (Goldstein & Iglesias, 1996a). Therefore, knowledge of appropriate phonological age ranges is of importance.

English Developmental Phonological Processes

Phonological processes are used by children until certain sounds are mastered, that is, when particular phonological processes begin to decrease. The processes are suppressed before the 3 years of age in English consist of reduplication, consonant harmony and stopping (Hodson, 1978). The processes that disappear before the 4 years of age in English are final consonant deletion, stopping of /s, v, z/, velar fronting, context sensitive voicing, weak syllable deletion and initial cluster reduction. The few phonological processes that persist after 4 years of age in English language consist of stopping and/or fronting /ʃ, ʧ, ʒ / and gliding of the English /ɚ/ (Grunwell, 1987).

There is a rapid pace of phonological development between the ages of 2 and 5 years of age as documented by a number of studies (Hodson & Edwards, 1997; Hodson, & Paden, 1991). Known characteristics of the English language system can offer insight into Spanish phonology as many of the sounds are the same or similar across the two languages.

Spanish Developmental Phonological Processes

By 3 years of age, the most prevalent phonological processes in Spanish are cluster reduction, gliding of the liquid, deletion of the stop with retention of the liquid. By 4, most speakers of Spanish will have mastered consonants and vowels (Goldstein, 1996).

According to Martinez (1986), tap trill /r/ deficiencies, consonant sequence reductions, deaffrication, stopping, affrication, fronting, assimilations, palatalization, metathesis, migration, vowel deviations, and sibilant distortions are the processes evident after the age of 4 in Spanish-English speaking children of Mexican descent. Consonant sequence reduction, de-affrication, and a number of non-phonemic deviations and tap/trill deficiencies are evident after age 4 in monolingual children of Mexican descent (Becker, 1982).

Interaction of English and Spanish Articulation and Phonology

Articulation and phonological processes can be unique to each language; however, there appears to be some universality across languages (Chomsky & Halle, 1968; Jakobson, 1971; Locke, 1980; Macken & Ferguson, 1981). That is, general patterns appear to exist, regardless of language (i.e., universal theory). Early phonological development in children learning Japanese, German, Russian, Slovenian, Norwegian, Czech, Italian and Arabic also seem to demonstrate early use of stops, nasals and glides, whereas fricatives, affricates and liquids are developed later (Anderson & Smith, 1986; Major, 1987). In addition, phonological processes such as stopping, cluster reduction, and assimilation have been observed in children from these various linguistic communities and appear to be universal features of phonological development.

The urgent need for data developmental patterns of the Spanish is vital to understanding the phonological patterns in Spanish speaking children (Yavas & Goldstein, 1998). Currently, there are a total of 30 million United States residents over the age of 5 whom speak Spanish in the home (U.S. Census, 2004).

Hispanics as a group have a higher percentage of preschoolers among the population than any other race or ethnic group in the U.S. There are 4.2 million preschoolers (i.e., younger than 5 years of age) whom speak another language other than English. Florida was home to over 1.5 million Hispanic residents in 2004. Half of the nation's Cuban residents reside in Miami/Dade County, Florida (U.S. Census, 2004). The rise of bilingual children in the United States (U.S. Census, 2004) supports the need for developmental information relevant to bilingual children.

Information on phonological development in Spanish speaking children has shown distinct differences when compared to monolingual English speakers (Goldstein & Cintron, 2001). It has been shown that there is a trend to misdiagnose children's speech as disordered when comparing bilingual speakers to monolingual children. When children acquire a second phonological system, (e.g., English) the error patterns seem largely affected in the primary language and while not as much in the second language (Brice, 1996).

The acquisition of two or more languages is influenced by the articulation and phonological rules of each language. The articulation and phonological rules of the first language sometimes positively influence the second language's rules, and consequently results in correct production. However, the first and second language may interact negatively which results in articulation and/or phonological interference.

Spanish speakers who are bilingual will perform differently in Spanish from monolingual speakers of Spanish (Grosjean, 1989). It is inevitable that young Spanish speakers in the United States will have contact with English. Therefore, the possibility of finding pure Spanish speakers in the U.S. is unlikely.

It is known that some influence from English will affect the children's Spanish articulation and vice versa. A brief comparison of English and Spanish phonetics is presented.

English has 24 consonants, 2 semi-vowels, and 17 syllabic nuclei. Spanish, in comparison, has 19 consonants, 2 semivowels, and 10 syllabic nuclei. The phonemes /b, d, g/ are Spanish allophones of the English phonemes, /b, d, g/ (Cotton & Sharp, 1988). Blends involving /s/ cannot appear in word or syllable initial positions in Spanish but can appear in English (Brice, 1996). Another difference is that Spanish words end in vowels or /n, r, s, l, d/. Refer to Table 3 (adapted from Brice, 1996).

Table 3 Summary of Articulation/Phonological Differences between English and Spanish

English	**Spanish**
English has 24 consonants.	Spanish has 19 consonants.
English has 15 vowels.	Spanish has 5 vowels.
The following Spanish consonants do not exist in English: /x, r , R, ŋ, β /.	The following English consonants do not exist in Spanish: /v, θ, ð, z, ʤ /.
English has many consonants occurring in the final position.	Only /s, n, r, l, d/ can occur in the final position.
The phonemes /t/ and /d/ are produced apical and aspirated.	The phonemes /t/ and /d/ are produced dentalized and unaspirated.
English has /s/ clusters in the initial position.	Spanish does not have /s/ clusters in the initial position.
English has many final clusters.	Final clusters are rarely seen in Spanish.
English dialects are affected by vowel differences.	Spanish dialects are affected by consonantal changes in fricatives, liquids, and nasals.
English has many single syllable words.	Spanish has very few single syllable words.
English is stress timed.	Spanish is syllable timed.
In English, /ð/ is a high frequency sound.	In Spanish, /s/ is a high frequency sound.
English is comprised of many consonant clusters.	Spanish is not comprised of many consonant clusters.
Final syllable productions are important in English, due to morphological makers occurring at the end of the word.	In Spanish, accurate final syllable productions are not very important.
Consonantal productions in English are usually lax.	Consonantal productions in Spanish are usually tense.

Several studies have collected phonological acquisition data for bilingual speakers involving Spanish and English. For example, Becker (1982) examined two groups (n = 20) of 4 year old Spanish speaking (i.e., Mexican dialect) children. She found that both groups of children displayed less than 3% of occurrence for pre- and post-vocalic singleton omissions and syllable reductions. Spanish speakers evidenced more cluster reductions. English speakers evidenced more liquid deviations. Other recent studies have shown similar developmental processes (Brice, 1996; Villanueva, 1990; Yavas & Goldstein, 1998).

Jimenez (1987) studied 120 Hispanic children of Mexican descent between the ages of 3to 5.7 years who all spoke Spanish as their primary language, but were bilingual and in Kindergarten or a Head Start program in California's Sacramento Valley.
The results were that the greatest variability occurred on the /s/ phoneme. By 5 years, only two consonants had not reached the 90% level, of production accuracy the /s/ and the /r/ (tap).

Brice (1996) stated that syllable reduction/deletion has been found to be a frequently occurring process among bilingual speaking children. Spanish syllable structure does not emphasize final consonants. In addition, syllable reduction and post-vocalic omissions seem to be strongly influenced by Spanish dialect, and thus are not true errors (Brice, 1996).

According to Goldstein and Iglesias (1996b), initial consonant deletion (in 3 year-olds only), liquid simplification, stopping, and cluster reduction of a liquid member were all commonly occurring processes of 54 bilingual, Spanish/English speakers residing in Philadelphia, with a Puerto Rican descent and an age range of 3-4 years of age.

Statement of the Problem

There are currently 5 million children under the age of 5, who are bilingual, living in the United States. It is predicted that by the year 2025, over 51 million individuals of Hispanic/Latino descent will reside in the United States (U.S. Census, 2005). By 2025, Census data show that the population of Florida will increase by some 26 percent adding another 5.5 million people to the state. With the predicted rise in this particular population, assessment techniques and interpretation practices will need to be updated in order to correctly represent the dialectical features of Spanish speaking children in Florida and the nation

There are a limited amount of studies yielding data on the development of Spanish phonology in 4 and 5 year old children residing in the United States, particularly in Florida. The need for normal developmental phonological Spanish data with regards to the different Spanish dialects is in high demand at the present and will continue to be a desirable topic of research and clinical interest with the increasing Hispanic population in Florida.

Articulation and phonological development in other languages, e.g., Spanish, has yet to be thoroughly studied. Consequently, there is limited normative information pertaining to articulation and phonological development in Spanish speakers. Therefore, if Spanish normative data are not available then appropriate assessment of phonological disorders remains uncertain.

Hypotheses

It is postulated that normal, bilingual, Spanish/ English speaking children, ages 4 to 5 years old, will display different articulation and phonological processes in English versus Spanish when measured with standardized English and Spanish articulation and phonology tests (i.e., the *Goldman-Fristoe Test of Articulation, GFTA*, the *Khan-Lewis Phonological Analysis*, and a Spanish articulation and phonology research test, i.e., the *Comprehensive Assessment of Spanish Articulation/Phonology, CASA-P*).

Specifically, the hypotheses for this study are:

1. It is hypothesized that there will be differences for the group of 16 bilingual (i.e., Spanish-English speaking) children for articulation in English versus Spanish as measured by percentage of consonants correct.

2. It is hypothesized that there will be differences for the group of 16 bilingual (i.e., Spanish-English speaking) children on phonological processes as measured by percentage of occurrence errors in English versus Spanish phonology.

CHAPTER 2: METHODOLOGY

Participants

A total of 16 out of 18 bilingual (Spanish/English) 4 to 5 year olds (eight 4 year olds and eight 5 year olds) enrolled in a preschool or head start program participated in this study. Two participants were excluded from the data collection because they did not pass the speech screening indicating that articulation and phonological difficulties were present. The children included in the study consisted of 6 females and 10 males. The children were enrolled in an elementary school in Orlando, a Head Start program in Orlando, and/or a preschool development center in Miami, Florida. The children ranged in age from: 3.7 to 5.7 (M=4.8 years of age). The children were from the following countries and spoke the Spanish dialects of: (a) Puerto Rico (n= 9); (b) Argentina (n= 1); (c) Bolivia (n= 1); (d) Columbia (n= 1); (e) Cuba (n= 1); (f) Dominican Republic (n= 1); (g) Nicaragua (n= 2). See Table 4.

Table 4 Age Ranges and Nationalities of Children in the Study

Gender	Age	Country of Origin	Primary (1st) Language	Dialect
F	5.1	Puerto Rico	Spanish	Puerto Rican
M	4.8	U.S.	Spanish	Puerto Rican
F	4.1	Cuba	Spanish	Cuban
M	5.3	Puerto Rico	Spanish	Puerto Rican
M	5.2	U.S.	Spanish	Puerto Rican
M	4.5	U.S.	Spanish & English	Columbian and Cuban
F	5.5	Puerto Rico	Spanish	Puerto Rican
M	3.7	U.S.	Spanish	Puerto Rican and Nicaraguan
M	4.1	Not Known	Spanish	Puerto Rican
F	4.5	U.S.	Spanish	Dominican Republic
M	5.4	Puerto Rico	Spanish	Puerto Rican
F	4.0	U.S.	Spanish	Argentine, Peruvian, Venezuelan
F	5.5	U.S.	Spanish and English	Ecuadorian
M	5.7	U.S.	Spanish	Bolivian
M	5.4	U.S.	Spanish	Puerto Rican and Nicaraguan
M	5.0	Not Known	Spanish	Not Known

The children's language use was obtained from parent report. All of the children currently spoke Spanish and English at home and at school. However, parent report indicated that the children were predominantly exposed to Spanish (i.e., a majority of their listening and speaking time). All of the children were normally developing and had no previous history of a speech or language delay or disorder. In order to ensure the nonexistence of a language disorder a language screening was administered to the children.

The *Structured Photographic Expressive Language Test-Spanish (SPELT-S)* was administered. All children were required to pass the majority of the items (i.e., 13/25). It was also reported that no problematic behaviors at home or in the classroom were noted.

All children passed a hearing screening presented by a University of Central Florida's Communicative Disorders Graduate Student Clinician supervised by an ASHA certified speech-language pathologist. The hearing screening tested the hearing abilities of pure tones at 500, 1,000, 2,000, 4,000 and 6,000 at 25 dB. An oral-peripheral exam was also given to rule out any abnormalities in the structure or function of the oral mechanism which could potentially interfere with phoneme production. None of the children included in this study failed the screening for communication disorders.

Procedures

A researcher developed test (i.e, the *Comprehensive Assessment of Spanish Articulation-Phonology, CASA-P*) consisting of 37 items was given to assess Spanish phonology for the group of 4 and 5 year old Spanish-English speaking children.

Refer to Appendix A for the list of words. The children were tested in a quiet room and given instructions in Spanish and English. All of the sessions were video recorded using a Panasonic Super VHS 456 Pro-Line video camera.

Development of the CASA-P

The *Comprehensive Assessment of Spanish Articulation-Phonology (CASA-P)* was designed to test the articulation and phonological production of Spanish speaking children. It was created by two faculty members in the Department of Communication Sciences and Disorders at the University of Central Florida. The first is an Associate Professor, a proficient Spanish-English speaker and also knowledgeable about Spanish and English phonology. The second faculty member is an Associate Professor proficient in English phonology. The data from this study was collected as a part of an American-Speech-Language-Hearing Association grant from the Office of Multicultural Affairs. Another faculty member assisted in the initial project and assistance in the data collection.

The *CASA-P* assesses all initial and final consonants in Spanish. The test was developed to be age appropriate for preschool children (i.e., 3 to 5 years of age). At least ten occurrences for each phonological process (described below) were elicited during the assessment. Content validity of the test was developed through the following two means:

1. A comprehensive review of the literature was conducted regarding Spanish articulation and phonology. The review of the literature (Acevedo, 1989; Brice, 1996; Eblen, 1982; Esther, 2005; Goldstein & Iglesias, 1996; Jimenez, 1987; Mann & Hodson, 1994; Martinez, 1986; Paulson, 1989; Rivera-Umpiere, 1988; Villanueva, 1990) indicated the following ten phonological processes to be highly occurring in Spanish phonological development: (a) Final consonant deletion; (b) Velar fronting; (c) Palatal fronting; (d) Stopping; (e) Liquid simplification; (f) Assimilation; (g) Cluster simplification; (h) Syllable reduction; (i) Pre-vocalic singleton omission; (j) Tap/trill deficiency; and (k) Stridency. Of these ten processes, seven are common to both Spanish and English (Brice, 1996; Hodson, 1978; Martinez, 1986; Paulson, 1989; Rivera-Umpiere, 1988; Villanueva, 1990). Therefore, the following seven processes were compared between Spanish and English phonological development: (a) Final consonant deletion; (b) Velar fronting; (c) Palatal fronting; (d) Stopping; (e) Liquid simplification; (f) Cluster simplification; and, (g) Syllable reduction. Refer to Table 5.

2. Six fluent Spanish speakers reviewed the items for age appropriateness and standard Spanish pronunciation. The review panel consisted of two speakers of Cuban Spanish dialect, one speaker of Puerto Rican Spanish dialect, one speaker of the Costa Rican Spanish dialect, and one speaker of Peruvian Spanish dialect. The bilingual speakers all assisted in transcribing the stimuli test words (narrow and broad transcription of the items were performed) during six meetings consisting of an estimated one hour each to ensure correct transcription of the Spanish word items and a common Spanish vocabulary choice. Consensus of 100% agreement was achieved.

Table 5 Phonological Processes Assessed for the CASA-P

Authors	Acevedo (1989)	Brice (1996)	Eblen (1982)	Esther (2005)	Goldstein & Iglesias (1996)	Jimenez (1987)	Mann & Hodson (1994)	Martinez (1986)	Paulson (1989)	Rivera-Umpiere	Villanueva (1990)	Walters (2000)	Yavas & Goldstein (1998)
Phonological Processes													
1. Final Consonant Deletion	X	X		X				X	X	X	X		X
2. Fronting							X	X				X	X
3. Stopping			X				X	X					X
4. Liquid Simplification					X		X			X		X	X
5. Assimilation									X		X		X
6. Cluster Simplification		X	X		X		X	X	X	X	X	X	X
7. Syllable reduction				X	X			X	X		X		X
8. Pre-Vocalic Singleton Omission				X	X			X	X	X	X		
9. Tap/Trill Deficiency		X			X	X		X	X	X	X		
10. Stridency Deficiencies		X	X		X	X	X	X	X	X	X		

Two forms of the *CASA-P* were created in order to control for order effect when presenting the stimuli to the participants. Both forms consisted of the same stimuli only differing in the order of presentation. Form A was administered to 5 children and Form B was administered to 11 children.

The *CASA-P* was given to all of the children by a highly proficient bilingual Spanish-English speaker (i.e., either a graduate student supervised by the Spanish-English speaking faculty or by the Spanish-English speaking faculty member). The child was shown a picture and asked, "Que es esto" (What is this?). If the child did not respond, then delayed imitation was accepted. Delayed imitation was used by saying the appropriate word, administering a new picture, and then returning to the unknown picture to ask for the word (elicitation). If this was unsuccessful then direct imitation was accepted. The examiner transcribed the child's errors on the individual score sheets.

Intra-rater and Inter-rater Reliability

Transcription training for coding of the items was performed between the student researcher and the Spanish-English speaking faculty member. Both researchers were familiar with the International Phonetic Alphabet. A training agreement was achieved through transcribing 20% of the total number of items (i.e., all items for all the participants) together over 3 separate sessions lasting approximately 3 hours. A consensus of 100% was achieved indicating a high training agreement for the phonetic transcriptions and also coding of the data.

To establish intra-rater reliability the student researcher reanalyzed 10% of the data. The number of agreements divided by the total number of observations was calculated. An intra-rater reliability agreement of 94% was achieved indicating high agreement.

To establish inter-rater reliability the student researcher and the Spanish-English speaking faculty member analyzed 10% of the data. Each researcher independently scored the same participants. The number of agreements divided by the total number of observations was calculated. An inter-rater reliability agreement of 84.5% was achieved indicating high agreement among the two researchers.

Equipment

A Panasonic Super VHS 456 Pro-Line video camera was also used to video tape sessions and record the audio and verbal responses of the participants. The Panasonic camera microphone has a frequency response of 50-20,000 Hz and a signal to noise ratio of greater than 47dB. The camera was placed between three and six feet from the participants.

Data Analysis

Measures of central tendency (means) and dispersion (standard deviations) were calculated for each articulation production and for phonological processes for each language. Only phonemes in the initial and final positions of words common to both languages were compared. The dependent variables consisted of the percentage consonant correct for Spanish and English phonemes and percentage of occurrence for phonological processes in Spanish and English.

Since, the comparisons were calculated for within group differences (i.e., Spanish versus English production within the one group of bilingual participants), therefore, paired t-tests were calculated for the Spanish versus English articulation comparisons. Alpha was set at $p < .05$. level of confidence.

CHAPTER 3: RESULTS

Participants

Sixteen participants from the Orlando and Miami, Florida areas were tested. The participants consisted of eight 4 year olds and eight 5 year olds with six females and ten males. The children ranged in age from 3.7 to 5.7 with a mean age of 4.8 years. Country of the child or parent's origin varied with the majority coming from Puerto-Rico (n=11). All other Spanish language dialects included: Argentina, Bolivia, Chile, Columbia, Cuba, Dominican Republic, Mexico, Nicaragua, and Peru. Therefore, a diverse Spanish dialect was obtained from the participants. All children were normally developing as determined by a screening of language, oral motor skills, and hearing. All participants passed the screening tests. Attempts were made to match participants on known intervening variables (e.g., English exposure, Spanish exposure, middle SES, and schooling experience).

Independent and Dependent Variables

The active independent variables for this study were administration of the *Goldman-Fristoe Test of Articulation* (GFTA) and the *Comprehensive Assessment of Spanish Articulation-Phonology (CASA-P).* In addition, the assigned independent variables for this study included the two languages that the children spoke (i.e., Spanish and English).

The dependent variables consisted of the results from the *GFTA, the Khan-Lewis Phonological Analysis* taken from the GFTA data, and the *CASA-P*. Specifically, percent consonant correct (PCC) were calculated for all articulation results (i.e., Spanish and English), while, percent process errors were calculated for all phonological processes (e.g., Spanish and English).

Paired T-Tests

Fourteen comparisons among Spanish and English initial single consonant sounds (/p, b, t, d, k, g, f, j, w, l, m, n, s, tʃ/ indicated that only one phoneme /tʃ/ yielded significant result differences [$t(15)=2.611$, $p=.020$]. Effect size r for /tʃ/ resulted in r^2 of .175 indicating a shared variance of 17.5%. Using Cohen's (1988) criteria (i.e., small=.10-.29; medium=.30-.49; large $\geq$.50), the effect size for this variable was small. See Table 6.

Table 6 Means, Standard Deviations and T-test Comparisons for Spanish and English Initial Consonant Comparisons

Sound	Mean (Spanish, English)	Standard Deviation (Spanish, English)	t	df	p
/p/	1.000 1.000	.0000 .0000	NF	15	NF
/b/	.9375 1.000	.2500 .0000	1.000	15	.333
/t/	1.000 1.000	.0000 .0000	NF	15	NF
/d/	1.000 1.000	.0000 .0000	NF	15	NF
/k/	.8750 .9375	.3415 .2500	-.565	15	.580
/g/	1.000 1.000	.0000 .0000	NF	15	NF
/f/	1.000 1.000	.0000 .0000	NF	15	NF
/j/	.9375 .6875	.2500 .4787	1.732	15	.104
/w/	.9375 1.000	.2500 .0000	-1.000	15	.333
/l/	1.000 1.000	.0000 .0000	NF	15	NF
/m/	.9375 1.000	.2500 .0000	-1.000	15	.333
/n/	1.000 1.000	.0000 .0000	NF	15	NF
/s/	.9375 .8125	.2500 .4031	1.000	15	.333
t∫/	1.000 .6875	.0000 .4781	2.611	15	.020*

NF= No Figure, could not be computed because the standard error of the difference is 0.
* Significant at p< .05

Four final consonant sounds were compared among Spanish and English. These results indicated that only one consonant was significantly different, i.e., /d/ [t(15)=-2.423, p=.029]. Effect size r for /d/ resulted in r^2 of .004 yielding a shared variance of .43%, indicating almost no shared variance. Thus, the /d/ phoneme was significantly more correct in English versus Spanish. One trend was noted, i.e., /l/ [t(15)=1.861, p=0.83]. All other comparisons were non-significant. See Table 7.

Table 7 Means, Standard Deviations and T-test Comparisons for Spanish and English Final Consonant Comparisons

Sound	Mean (Spanish, English)	Standard Deviation (Spanish, English)	t	df	p
/d/	.5625 .9375	.5123 .2500	-2.423	15	.029*
/l/	1.000 .8125	.0000 .1007	1.861	15	.083**
/n/	.9375 .9375	.2500 .2500	.000	15	1.000
/s/	.7500 .8125	.4472 .4031	-.436	15	.669

* Significant at $p < .05$;
** Trend

Seven phonological processes common to both Spanish and English were compared: (a) Final consonant deletion; (b) Velar fronting; (c) Palatal fronting; (d) Stopping; (e) Liquid simplification; (f) Cluster simplification; and, (g) Syllable reduction. Two of the seven phonological process comparisons between Spanish and English were statistically significant, i.e., stopping [$t(15)=-6.526$, $p=.000$) and velar fronting ($t(15)=-2.355$, $p=.033$). Effect size r for stopping yielded an r^2 of 0.57 indicating a shared variance of 57%. According to Cohen's (1988) criteria, this effect size was considered to be large. Effect size r for velar fronting resulted in an r^2 of .147 indicating a shared variance of 14.7% and a small effect size. All other phonological comparisons were non-significant. Refer to Table 8.

Table 8 Means, Standard Deviations and T-test Comparisons for Spanish and English Phonological Process Comparisons

Phonological Process	Mean (Spanish, English)	Standard Deviation (Spanish, English)	t	df	p
Final consonant deletion	1.750 2.250	1.9493 4.9598	-.466	15	.648
Velar fronting	.0000 2.312	.0000 3.928	-2.35	15	.033*
Palatal fronting	.0000 .6875	.0000 2.750	-1.00	15	.333
Stopping	.0000 8.312	.0000 5.095	-6.52	15	.000*
Liquid simplification	1.750 1.750	3.255 4.123	.000	15	1.00
Cluster simplification	1.750 1.750	3.255 4.123	.000	15	1.00
Syllable reduction	1.750 .3750	5.9721 1.0878	.975	15	.345

* Significant at p< .05

Descriptive Analyses

Two Spanish sounds were descriptively analyzed. These consisted of /β/, a bilabial fricative, and CC /ŋ/ (i.e., the "ñ" sound). Twenty English sounds occurring in the initial and final positions were analyzed. These English sounds either do not occur in Spanish (e.g., the voiceless and voiced / θ/, /ð/ "th" sounds) or do not occur in the final position of Spanish words. These sounds consisted of: (a) Initial sounds of /d/, /ʒ/, / θ/, /ð/; and (b) final sounds of /p, b, t, k, g, f, v, z, m, tʃ, ʃ, θ, ð , ɚ , d, ʒ , ŋ/ . Descriptive analysis reveals that for initial sounds, the voiceless and voiced /θ, ð/ were produced with less than 75% accuracy, indicating that these sounds are more difficult to acquire for Spanish speakers learning English. See Figure 1.

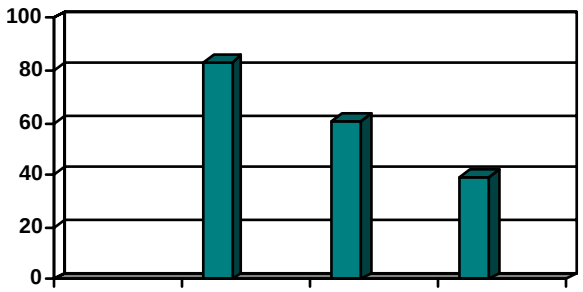

Figure 1 Percent Consonant Correct for Initial Phonemes in English

Analysis of the final consonant English sounds indicates that the final /b, v, tʃ, ʃ/ were produced with less than 75% accuracy. These sounds are more difficult to attain for Spanish speakers acquiring English. See Figure 2.

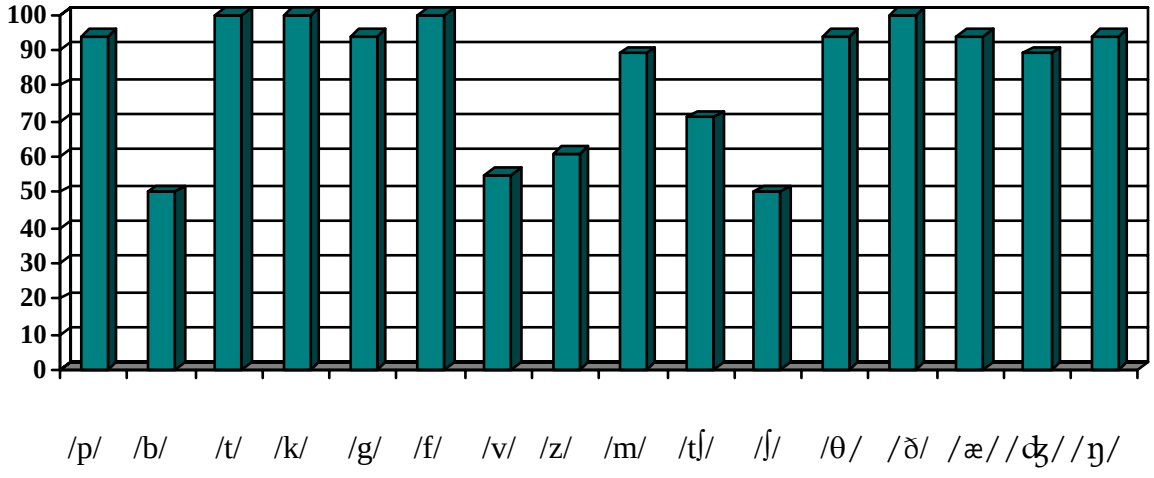

Figure 2 Percent Consonant Correct for Final Phonemes in English

One Spanish phonological process, i.e., Spanish interference on English productions was descriptively analyzed. In addition, three English phonological processes were descriptively analyzed, i.e., deaffrication, initial devoicing and final devoicing. Five of the 16 participants exhibited interference errors in their English phonological productions (errors ranged from 2 to 8%). Nine participants exhibited deaffrication errors (errors ranged from 33 to 67%). Three participants exhibited initial devoicing errors (errors ranged from 0 to 4%), while, eight participants exhibited final devoicing errors (errors ranged from 3 to 9%).

CHAPTER 4: DISCUSSION

Background and Discussion of This Study

Most researchers generally agree on an average age range for English phoneme development in normally developing children. Ages agreed upon are not exact; however, most studies have a general range of age of acquisition. In the Prather et al. study (1975), the majority of English sounds were acquired before the age of three with most sounds acquired around the age of 2 to 2.5. In sum, most normal English phoneme development occurs before age five (Arlt & Goodban, 1976)

The overall acquisition process is similar between Spanish and English, however dialectical differences and variations differentiate the two languages (Brice, 1996). Spanish dialects are characterized by consonant differences which affect large sound classes (Cotton & Sharp, 1988). In contrast English dialects are influenced by changes in vowel structure and production. This would imply that phoneme production in Spanish could be misjudged as articulation errors because Spanish dialect influences consonants (i.e., this is what English articulation tests assess). For example, it is known that fricatives and liquids show greater variation in the various Spanish dialects than in English (Iglesias & Goldstein, 1998).

The general development phonological processes of children learning their first language is similar across languages (Eblen, 1982). All children simplify their language when learning correct phoneme productions. Simplification processes are considered normal because they are expected at the beginning of the learning process. This phonological process would be considered abnormal if it were to persist past the average age range of phoneme development. Therefore, knowledge of accurate phonological age ranges is of importance.

In English, the processes that are developmental and which gradually disappear before the age of 4 are as follows: (a) final consonant deletion, (b) stopping of /s, z, v/, (c) velar fronting, (d) context sensitive voicing, (e) weak syllable deletion, and (f) initial cluster reduction (Hodson, 1978). The known characteristics of English phonological development can be generalized to some degree to Spanish phonological development because both languages share many of the same sounds.

By three years of age, the most prevalent phonological process in Spanish are cluster reduction, gliding of the liquid, and deletion of the stop with retention of the liquid. As in English, the /ɚ/ is a continuing problem whereupon children simplify this sound by either substitution or distortion.

Articulation and phonological processes across two languages share some universality, however, there appears to be uniqueness for each language (Chomsky & Halle, 1968; Jakobson, 1971; Locke, 1980; Macken & Ferguson, 1981). Spanish speakers who are bilingual Spanish-English speakers will perform differently in Spanish from monolingual speakers of Spanish (Grossjean, 1989).

The interaction between the two languages produces its own variations that are no longer comparable to each individual language. Therefore, information on phonological development in Spanish-English speaking children has shown distinct differences (i.e., interference or transference of sounds and phonological processes) when compared to monolingual English speakers (Goldstein & Cintron, 2001). Consequently, there is an urgent need for normative data on Spanish phonology in Spanish-English speaking children (Yavas & Goldstein, 1998).

Summary of Findings and Interpretations

It was hypothesized that there would be differences for the group of 16 bilingual (i.e., Spanish-English speaking) children for place, manner and voicing of articulation in English versus Spanish as measured by percentage of consonants correct. Only one consonant in the initial position was significantly different, i.e., /tʃ/. The /tʃ/ phoneme is an affricate which means it is part stop and part fricative. It is a late developing phoneme in English and in Spanish. The results indicated that participants produced /tʃ/ with 100% accuracy in Spanish compared to 69% accuracy in English. In English, the children deaffricated the phoneme to a fricative, i.e. the word “church” was simplified to “shurch”. Therefore, the children are not transferring the production of /tʃ/ from Spanish to English at this point in their English development. It should be noted that measures of variance in initial and final phoneme productions in Spanish and English were large. It appeared that some children had mastered the correct sound productions, thus, yielding no variance, while, other children had not yet acquired these sounds and revealed variance in their scores.

Descriptive data indicated that the /j/ phoneme was produced at 94% correct in Spanish and 69% correct in English. This shows a decreased performance in initial position phonemes during English productions. It appears that the children are not generalizing from their first language to English. One reason for this discrepancy could be that Spanish initial consonants are usually tense in nature and this could be causing interference of the phoneme across languages. The children are making the phoneme more complicated by changing the glide to an affricate, i.e. “yellow” to “jello”.

Initial voiceless /θ/ and voiced /ð/ were produced with less than 75% accuracy in English, indicating that these sounds are difficult to produce for Spanish speakers since these sounds are not in the consonant inventory of the Spanish language. Production of these phonemes resulted in substitutions, deletions and distortions.

Only one consonant was significantly different for final phoneme productions, i.e., /d/. Spanish production had a 63% accuracy rate for percent consonant correct in comparison to English which had a 100% consonant correct. The children were emphasizing the final consonant /d/ in English, while omitting it in some situations in Spanish. Final consonant deletion is common in Spanish because of a lax production of final consonants. An example of this deletion would consist of “mitad” being produced as “mita” in Spanish.

The production of the phoneme /l/ was correct 100% of the time in Spanish and was produced 81% consonant correct in English. In English the phoneme /l/ is developmentally difficult for younger children to produce.

They will usually vowelize the phoneme, i.e. “shovel” will be produced as “shovo”. This pattern appeared to be occurring for some Spanish speaking children as they did not generalize the correct production to English.

Final /n/ was produced with less accuracy in English with 81% consonant correct and in Spanish 100% consonant correct. This could be due to incorrect auditory perception of the phoneme or a simplification process. Children changed the English /n/ to an /m/, i.e. “gun” was produced as “gum”.

Final /s/ production was 63% correct in Spanish and 88% correct in English. During Spanish and English production the /s/ phoneme was aspirated and interdentalized, which could be due to the complexity of the phoneme. The /s/ is a later occurring phoneme and is not developmentally appropriate for these aged children to produce.

It was hypothesized that there would be differences in the group of 16 bilingual (i.e., Spanish-English speaking) children for phonological processes as measured by percentage of occurrence errors in English versus Spanish phonology. Two of the seven phonological processes were significantly different in their comparisons: (a) stopping; and (b) velar Fronting. Stopping could have been more difficult for children in English (9% occurrence) than in Spanish (0% occurrence) because there are more fricatives in English which can be stopped as compared to in Spanish where there is only one fricative, which could be stopped. Fronting occurred 4% of the time in English and 0% of the time in Spanish. This could be due to the Spanish language being more anteriorly placed (Brice, 1996).

Five of the 16 participants exhibited interference errors; nine participants exhibited deaffrication errors, three participants exhibited initial devoicing errors, and eight participants exhibited final devoicing errors. All of these processes can be attributed to interference between languages because English was a second language for all of the children. As with production of phonemes, there appeared to be large differences in variance scores for phonological processes in Spanish and English. It also appeared that some children had mastered the phonological productions, thus, yielding no variance, while, other children had not yet acquired these productions and revealed variance in their phonological occurrence scores.

Implications

Normative articulation and phonological data are useful information for speech-language pathologists in today's public school. As the Hispanic school population increase this information is beneficial as a reference for speech productions which should not be counted as errors in and of themselves. Upon examining the results of an assessment on a bilingual child the speech-language pathologist should differentiate disordered productions from dialectal and interference errors in Spanish speaking children. The speech-language pathologist would then be able to apply this information to intervention with the child.

Further research should include more participants, e.g., Spanish-English speaking children with phonological disorders, as the Hispanic population is increasing especially in the state of Florida. Larger sample sizes should be studied in order to create a more accurate valid representation of the population of Spanish-English speaking children in Florida.

Research on this topic should be expanded to include normative data for disordered bilingual children in order to apply more appropriate treatments. In addition, other languages should be studied as the state of Florida is also experiencing growth in other languages beyond Spanish.

APPENDIX A: COMPREHENSIVE ASSESSMENT OF SPANISH ARTICULATION-PHONOLOGY, CASA-P, LIST OF WORDS

1. Planta
2. Puerta
3. Nadar
4. Cuchara
5. Tigre
6. Chicle
7. Club
8. Ventana
9. Flecha
10. Radio
11. Bloque
12. Muneca
13. Llave
14. Boca
15. Lago
16. Hueso
17. Mariposa
18. Flor
19. Fresa
20. Globo
21. Mitad
22. Sobre
23. Brazo
24. Feliz
25. Gallo
26. Lapiz
27. Bicicleta
28. Sofa
29. Huevo
30. Trompeta
31. Hierba
32. Gigante
33. Aprisa
34. Dentadura
35. Sopa
36. Vaso
37. Cruzar
38. Dracula
39. Primero
40. Grande
41. Pedal
42. Jardin

APPENDIX B: GOLDMAN-FRISTOE TEST OF ARTICULATION OF WORDS

1. House
2. Telephone
3. Cup
4. Gun
5. Knife
6. Window
7. Wagon
8. Chicken
9. Zipper
10. Scissors
11. Duck
12. Vacuum
13. Matches
14. Lamp
15. Shovel
16. Car
17. Rabbit
18. Fishing
19. Church
20. Feather
21. Pencils
22. Carrot
23. Bathtub
24. Thumb
25. Finger
26. Ring
27. Jumping
28. Pajamas
29. Plane
30. Blue
31. Brush
32. Drum
33. Flag
34. Santa Claus
35. Christmas Tree
36. Squirrel
37. Sleeping
38. Bed
39. Stove
40. Wheel
41. Yellow
42. This
43. Orange
44. Path

APPENDIX C: LETTER OF CONSENT

Consent Letter

Dear Parent,

We are Dr. Alejandro Brice and Dr. Linda Louko, Assistant Professors at the University of Central Florida. This letter is to ask your permission for your son or daughter _____ to be a part of a study being performed by ourselves through the Department of Communicative Disorders at the University of Central Florida. Please fill out this form by your signature below.

The University of Central Florida is an agency of the State of Florida regulated by state law. The State of Florida is self-insured to the extent of its liability under law; liability in excess of that specified in statute may be awarded only through special legislative action. Accordingly, the University of Central Florida's ability to compensate you for any injury that may occur suffered during this research study is very limited

The purpose of this study is to compare bilingual phonology and language skills. The study is to last approximately one hour. There are no foreseeable discomforts. Minimal risks are involved. Your son/daughter may be identified by name, although this risk is being reduced. The sessions will be video taped so that the phonology patterns used may be written down for further study. Use of the tapes will be for data gathering and possible instructional purposes. The results are to be used for a better understanding of bilingual phonology and language development. The results of the measures taken (phonology tests given) will be kept confidential and will not affect your son or daughter's school placement or grades in any way. You are free to withdraw at any moment of this study without any consequences. This study may be stopped by myself due to unforeseen circumstances. If important findings develop during the course of this study, then they will be shared with your son/ daughter which may relate to your continued participation, we will also keep you informed of important results from this study. We will follow-up with a phone call to keep you informed of your child's performance. If you accept please return this form to the school to where your child attends and please sign where it is marked below.

You may reach us at 407-249-4798, ext. 104/Department of Communicative Disorders, UCF, 12424 Research Park Boulevard, Suite 200, Orlando, FL 32826-2215 if you have any questions. Your rights as a research volunteer may be obtained from;

Chris Grayson, IRB Coordinator
University of Central Florida (UCF)
Office of Sponsored Research (OSR)
4000 Central Florida Boulevard
Administration Building, Suite No. 243
Orlando, Florida 32816-0150
Telephone: (407) 823-2901
E-mail address: cag86399@mail.ucf.edu

I have read and I understand the procedures described above. I agree to allow my child,_____to participate in the procedures and I have received a copy of this description.

_____	_____	_____	_____
Parent Signature	Date	Principal Investigator	Date

APPENDIX D: UCF IRB PERMISSION LETTER

University of Central Florida

Sponsored Research

January 18, 2000

Alejandro Brice, Ph.D.
Department of Communicative Disorders
College of Health and Public Affairs
University of Central Florida
4000 Central Florida Boulevard
Orlando, Florida 32816

Dear Dr.. Freer:

With reference to your protocol entitled, "Phonological Characteristics of 4-5 Year Old Spanish and Spanish-English Speakers," I am enclosing for your records the approved, executed document of the Assurance of Protection of Human Subjects form you had submitted to our office.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board. Further, should there be a need to extend this protocol, a new assurance of Protection of Human Subjects form must be submitted for approval at least one month prior to the anniversary date of the most recent approval and is the **responsibility of the investigator** (UCF). No notification will be sent from the IRB.

Should you have any questions, please do not hesitate to call me at 823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

Chris Grayson
Institutional Review Board (IRB)

Enclosure

Copy: IRB File

Office of Research and Graduate Studies
4000 Central Florida Blvd. Adm. 243 • P.O. Box 160150 • Orlando, FL 32816-0150
(407) 823-3778 • FAX (407) 823-3299

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