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DISSERTATION

SPANISH LANGUAGE DEVELOPMENT AND TRAJECTORIES OF YOUNG  
CHILDREN OF MEXICAN IMMIGRANTS

Submitted by

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In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

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Fort Collins, Colorado

Spring 2006

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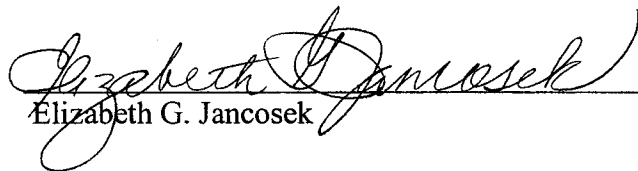
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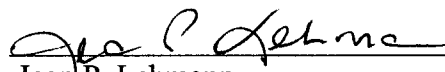
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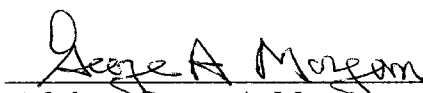
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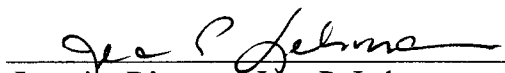
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## ABSTRACT OF DISSERTATION

### SPANISH LANGUAGE DEVELOPMENT AND TRAJECTORIES OF YOUNG CHILDREN OF MEXICAN IMMIGRANTS

The purpose of this study was to identify predictors of language maintenance versus attrition and to describe the Spanish language trajectories of group preschool-aged children of Mexican-immigrant descent. Specifically, this study investigated the relationship between observed child language behaviors, mother-child interaction characteristics, family/child language usage and exposure factors; and Spanish lexical diversity (vocabulary usage) in preschool aged children. Observed child language behaviors included code-mixing, percentage of errors, and use of general term/non-descriptive words. Mother-child interaction variables included maternal intrusiveness, maternal hostility, and quality of relationship. Language usage and exposure variables included language usage among family members as well as preschool enrollment and language usage with peers. Measurements from language transcripts, video samples, and parental surveys were collected for 19 children at roughly 3 and 4 years of age. Ten children were also seen at a third time point, roughly at 5 years of age; these children were administered the Spanish Language Assessment Procedure, a non-standardized Spanish language assessment.

Regression models were employed to explore how groupings and combinations of variables were related to the outcome variable. Primary analyses revealed that code-mixing and use of general term/non-descriptive words were not predictive of first

language (L1) attrition, while percentage of errors was predictive of L1 attrition. A variety of verb usage errors were observed in the children demonstrating language attrition; interestingly, these difficulties are also observed in children with Specific Language Impairment (SLI). Mother-child interaction variables and family language usage variables were not predictive of L1 maintenance or loss; however, years of preschool enrollment was positively associated with growth in Spanish vocabulary. Given the negative association between preschool enrollment and percentage of errors, it may be the case that language experiences afforded through preschool programs (even programs that involve some level of English exposure) support L1 maintenance. Exploratory analyses of language trajectories demonstrated the variability seen in bilingual children. Two subjects experiencing L1 attrition demonstrated different language behaviors and L1 attrition under differing language usage and exposure conditions. Implications for differentiating L1 attrition and SLI are provided.

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## Chapter I: Introduction

The number of preschool aged children from linguistically diverse backgrounds has drastically increased nationwide over the last decade. Programs for young children, such as Head Start, continue to report increased enrollment of linguistically diverse children. Non-English speaking households rose from approximately 21% in 1993 to approximately 24% in 1999; with the largest growth rate seen in Spanish speaking households, increasing from 17.5% to more than 20% (Administration for Children and Families, 2000). Currently there are over 2 million preschool-aged children of Hispanic/Latino descent in the United States (US Census Bureau, 2005). With this demographic trend it has become necessary for educators and interventionists to be informed about bilingual language development in young children. Professionals from schools, hospitals, and clinics are interfacing with these diverse populations and are responsible for determining when children from these groups are at risk for or present with disabilities. However, this issue is quite complex, as linguistic differences may mask, mimic or be confused for symptoms or characteristics of a specific disorder (Anderson, 2004; Cheng, 1991). In a study that surveyed 213 speech-language pathologists, one third of the respondents indicated that they had not received training to work with multicultural or multilingual populations; most of the respondents also indicated that they would not feel comfortable assessing individuals from culturally and linguistically diverse backgrounds (Hammer, Detwiler, Detwiler, Blood, & Dean Qualls, 2004).

Understanding language development in linguistically diverse populations is a complicated undertaking because children exhibit a wide range of language proficiencies that are dynamic and change over time (Silva Corvalan, 1991; & Figueroa 1994; Genesee, Paradis, & Crago, 2004). It is safe to assume that bilingual children are a heterogeneous group with varying language skills; this variability is linked to the type of bilingualism (simultaneous vs. sequential), time of L2 exposure, as well as context and quality of exposure to L1 and L2 (Patterson & Pearson, 2004). It is believed that bilingual language development can have a positive effect upon meta-linguistic and cognitive development (Homel, Palij, & Aaronson, 1987; Cummins, 1979; Genesee, Paradis, & Crago). However, when young children shift too quickly from using their first language (L1) to using mostly their second language (L2), their language and academic skills are likely to develop more slowly, and in some cases interventionists may erroneously consider these children delayed or disabled (Wong Fillmore, 1990; Anderson, 2004; Schiff-Myers, 1992). Differentiating individuals with L1 attrition from those with a disorder such as Specific Language Impairment (SLI), a developmental language disorder that affects a child's ability to acquire language, is complicated because these individuals can have language characteristics in common (Anderson, 1999a). Differentiating these individuals is also difficult because SLI characteristics can vary across languages; thus, what is characteristic of SLI in English may not be characteristic of SLI in Spanish or other languages (Restrepo & Gutiérrez-Clellen, 2004; Leonard, 1998). In order to understand typical and atypical language development in linguistically diverse and bilingual children, interventionists must understand language

behaviors and how language usage and exposure, as well as how educational experiences influence bilingual language development.

The purpose of this study is to determine the relationships between observed child language behaviors, mother-child interaction characteristics, family/child language usage and exposure factors, and Spanish language development in preschool aged children of Mexican-immigrant descent. This longitudinal study will provide information about the Spanish language development of 19 children from 33-37 months of age until 48-49 months of age; in addition, it will provide language trajectories for 10 subjects who also were seen at a third time point at 59-61 months of age. The children in this study can best be described as emergent sequential bilinguals, or Spanish speaking children who are just beginning to be exposed to English. A number of variables will be controlled by virtue of the homogeneity within this sample, including maternal language usage (uniformly Spanish only), lower SES, and first generation of immigration. The other variables will be described and defined shortly.

This study will contribute to a small body of literature that describes language development in Spanish speaking children living in the United States. Through the Bilingual Education Amendment of 1974 as well as other educational mandates (e.g. No Child Left Behind Act of 2001, the English Language Acquisition, Language Enhancement and Academic Achievement Act) children from linguistically diverse backgrounds are guaranteed educational programs tailored to their language and learning needs, yet there is a dearth of longitudinal studies that describe language and academic development in this population (Artiles, Rueda, Salazar, & Higareda, 2005). As the number of young Spanish speaking children continues to rise in this country, it is

becoming increasingly important to study development in these children. The knowledge gained from the current study about Spanish language development and trajectories of young Mexican-immigrant children will be useful to interventionists, educators, parents, educational administrators and policy makers, and may provide insight to future studies of this population.

Observed child language behaviors will include code-mixing, use of Spanish general term/non-descriptive words, and number of utterances containing errors. Mother-child interaction variables will include maternal intrusiveness, maternal hostility, and quality of relationship. Family/child language usage and exposure variables will include percentage of Spanish language usage by mother; father, and child; number of older and younger children in the home; child's language usage with siblings and peers; child's preschool enrollment status; and the number of weeks per year the child spent in Mexico. The dependent variable, Spanish language development, will be measured through expressive vocabulary (lexical diversity), obtained during naturalistic language samples. Specific attention will be paid to this element of Spanish language across time. Spanish lexical diversity and individual trajectories will be used to explore the profiles of language maintenance (maintenance or growth in Spanish lexical diversity) and language attrition (decrease in lexical diversity).

#### Definition of Terms

**Additive bilingualism-** bilingual development in which there is substantial support for continued L1 development as the individual acquires L2.

**Clitics-** unstressed direct and indirect object pronouns that are attached to the preceding verb (e.g. *dámelo* "give it to me").

**Code-mixing-** mixing or alternating between two languages within a single sentence.

**D-** a measure of lexical diversity, expressive vocabulary, obtained from language transcripts that involves 15 iterations (from 35 increasing to 50 words) and random comparisons of type/token ratio from the larger transcript.

**General term/non-descriptive words-** demonstrative pronoun forms and place adverbs that are non descriptive in nature (e.g. *ésa, este, alli*)

**Language attrition-** reduction in or weakening of an individual's L1 abilities

**Language maintenance-** continued L1 growth (in developing child) or stabilization of L1 proficiency and usage (in mature individual).

**Language shift-** the pattern of change in a community's language usage; in second and later generations of immigrant populations this shift is usually towards the L2.

**Language stability profile-** a description of language usage patterns at the individual level, a qualification that describes if an individual is in the process of losing or maintaining his/her first language (L1).

**L1-** an individual's first language.

**L2-** an individual's second language.

**Maternal hostility scale-** a 7 point scale that reflects the valence of the mother's affect expressed toward the child.

**Maternal intrusiveness scale-** a 7 point scale that describes the mother's style in allowing the child to gain autonomy and self-awareness.

**MCIDI-CC subscale-** *Minnesota Child Development Inventory (MCIDI) – Comprehension Conceptual subscale.*

**MLUw-** Mean length of an utterance (sentence) in words, how many words per sentence.

**Observed language behaviors-** bilingual language behaviors that are observable, including code-mixing, percentage of errors, and the use of general term/non-descriptive words.

**Quality of relationship scale-** a global 7 point scale that describes the qualitative elements of the dyad, including affective and reciprocity aspects of the mother-child interaction.

**Spanish D-** a measure of Spanish lexical diversity based on a calculation of D that uses Spanish words only and excludes all English words from the analysis.

**SLI (Specific language impairment)-** a developmental language disorder involving impaired ability to acquire language despite typical intelligence.

**Subtractive bilingualism-** bilingual development in which use of the majority culture's language (L2) is required or strongly encouraged and thought to replace L1.

**TTR (type/token ratio)-** a measure of lexical diversity calculated as a ratio of the number of different words (types) divided by the total number of words used in a given language sample.

## Research Questions and Hypotheses

### *Questions*

1. How do the observed child language behaviors of code-mixing, use of general term/non-descriptive words, and percentage of errors, change over time in young children of Mexican-immigrants?
2. What interaction patterns predominate in the mother-child dyads of Mexican-immigrants at 33-37 months of age?

3. How does family/child LI language usage, including language usage among family members and peers, and language exposure (e.g. preschool enrollment and visits to Mexico) change over time in young children of Mexican immigrants?
4. How is preschool exposure related to language maintenance or attrition in young children of Mexican immigrants?
5. How does MLUw compare with Spanish D as a language sample measure of language at 33-37 months of age?
6. What language stability profiles and Spanish language development trajectories are seen in children of Mexican immigrants?

*Hypotheses:*

1. Given what is known about the relationship between code-mixing, error patterns, vocabulary development, and language maintenance ( Brice & Anderson, 1999; Kuafman & Aronoff, 1991; Anderson, 1999a & 1999b), it is hypothesized that observed child language behaviors will be differentially associated with Spanish language development in the following ways:
  - 1a. The percentage of code-mixed utterances will not be associated with Spanish D change scores over and above the contribution of other predictors.
  - 1b. The percentage of utterances containing errors will be negatively associated with Spanish D change scores.
  - 1c. The frequency count of Spanish general term/non-descriptive words will be negatively associated with Spanish D change scores.

2. There is a dearth of research that has described the relationship between mother-child interaction and language maintenance in Mexican-immigrant populations; however, given what is known about parent-child cohesion and L1 maintenance in other immigrant populations (Luo & Wiseman, 2000; Sridhar, 1988) it is hypothesized that qualities of mother-child interaction will be related to a child's Spanish language development as follows:

2a. Maternal intrusiveness will be negatively associated with Spanish D change scores.

2b. Maternal hostility will be negatively associated with Spanish D change scores.

2c. Quality of relationship will be positively associated with Spanish D change scores.

3. A number of researchers have described the relationship between language usage and exposure variables and L1 maintenance (Wong Fillmore, 1991; Anderson, 2004; Hakuta & D'Andrea, 1992; Winsler, Diaz, Espinoza, & Rodriguez, 1999). Based on findings from these studies, family/child language usage and exposure will be differentially associated with Spanish language development in the following ways:

3a. The percentage of time mother and father use Spanish (if there is sufficient variability in these variables) will be positively associated with Spanish D change scores.

3b. The percentage of time child uses Spanish will be positively associated with Spanish D change scores.

3c. The number of older children in the home will be negatively associated with Spanish D change scores.

3d. The number of younger children in the home will not be associated with Spanish D change scores over and above the contribution of other predictors.

3e. The child's English language usage (English or English+Spanish) with peers and siblings will be negatively associated with Spanish D change scores.

3f. The number of weeks a child spends in Mexico a year will be positively associated with Spanish D change scores.

## Chapter II: Literature Review Language Profiles in Bilingual Children

In order to understand the language stability profiles and bilingual behaviors seen in bilinguals it is first necessary to describe types of bilingual language acquisition.

*Simultaneous acquisition* occurs when a child is exposed to both languages simultaneously from birth or a very early age, while *sequential acquisition* occurs when a child becomes exposed to and begins to learn L2 after developing his/her L1 (Tabors, 1997; Arnberg, 1987). This distinction between types of bilingual acquisition is important because acquisition type is thought to influence development in multiple ways (Tabors; Arnberg; Cook, 1997; Harley & Wang, 1997). For example, children who are sequential bilinguals demonstrate a great deal of variability in rates and stages of language acquisition (Roseberry-McKibben, 2003; Kayser, 2002; Genesee, Paradis, & Crago, 2004). Given that the focus of this paper is on language development in young Spanish speaking who are emergent sequential bilinguals, the majority of this literature review will include studies that included sequential bilinguals. However, in some instances, studies of simultaneous bilinguals will also be included.

Researchers use numerous terms to describe specific patterns of language usage seen in bilinguals, many of which are synonymous or slight variations of one another (Anderson, 2004; Fase, Jaspaert, & Kroon, 1992; Seliger & Vago, 1991, Schiff-Meyers, 1992). To simplify this matter, a uniform set of terms will be used throughout this discussion. *Language shift* is the pattern of change in a community's language usage

frequently seen in immigrant populations (Fase, et al.; Anderson; Hurtado & Vega, 2004). For example, language shift tends to occur in Mexican-immigrant population across generations and over time; whereas succeeding generations use less Spanish and more English (Hurtado & Vega). The term *language stability* describes language usage patterns at the individual level, including changes in language competence and usage (von Hapsburg & Peña, 2002; Grosjean, 1998). Because of the impact that language stability has upon a child's developmental pathway it is an important factor to consider when researching bilinguals, especially when grouping individuals and while interpreting findings (von Hapsburg & Peña; Grosjean). *Language stability profiles* assist in this endeavor; they describe if an individual is in the process of losing or maintaining his/her L1. For the current study language stability profiles will be described using the terms language attrition and language maintenance.

*Language attrition.* Language attrition is a process in which an individual's L1 abilities are reduced or weakened while his/her L2 skills become more established (Anderson, 2004; Schiff-Myers, 1992; Fase, Jaspaert, & Kroon, 1992). Language attrition may include decreases in use of L1 vocabulary, decreased L1 fluency, and/or the transfer of L2 rules to L1, or, in children, failure to manifest expected gains in L1 skills (Genesee, et al., 2004). While adults are thought to be more stable in their L1 because they have acquired L1 proficiency, they are susceptible to language attrition when they live in environments where they do not have the opportunity to hear or use L1. Cross-linguistic influences from another language being acquired also may influence their L1 language stability. (Sharwood Smith & van Buren, 1991). Children, on the other hand, are unstable in their L1 when there is *no* language attrition, because they are in the process of

acquiring language proficiency (Sharwood Smith & van Buren). Language attrition thus manifests in children's failure to gain proficiency as expected. Such a pattern occurs in young children when they begin to acquire a second language before they have had the opportunity to master or fully develop their first language (Cummins, 1979; Schiff-Meyers; Wong Fillmore, 1991; Tabors, 1997). Children who live in subtractive bilingual environments, environments where the use of the majority culture's language is required or strongly encouraged and thought to replace L1, inevitably experience language attrition (Genesee, et al.). The term language loss is frequently used interchangeably with the term language attrition; however, some researchers have described attrition as a form of language loss where certain aspects of the L1 are maintained while others do not continue to develop (Anderson, 2004). For the present study, which will attempt to describe L1 development in preschool-aged children, the term language attrition will be used to describe if a child demonstrates any evidence of reduced L1 skills.

*Language maintenance.* A second language stability profile, language maintenance, is a process in which there is continuous L1 growth or maintained L1 proficiency and usage (1992). Language maintenance results in L1 proficiency equal to that of monolingual speakers, and, includes the continued use of L1 (Tannenbaum, 2003; Hakuta & D'Andrea, 1992; Fase, Japaert & Kroon). Continued L1 usage is important for maintenance of L1 development in bilingual children because as linguistically diverse children in the United States begin elementary school, they are exposed primarily to L2 in their instructional settings, and under these conditions they may stop using L1. Moreover, for true language maintenance to occur, linguistically diverse children need to learn more than the household vernacular of their L1; they need to learn the cognitive

academic language that is typically fostered through educational experiences (Cummins, 1994; Echevarria & Graves, 1998; Schiff-Myers, 1992). Thus, in most cases, as children progress through formal schooling in their L2, they are less likely to maintain their L1. Children who are afforded bilingual educational experiences are the exception; under these circumstances both languages are used in instruction, and as a result L1 development is continued. These children come from additive bilingual environments where there is substantial support for continued L1 development and maintenance as the child acquires L2 (Genesee, et al., 2004).

*Observed language behaviors.* Bilinguals frequently present with an interesting array of bilingual behaviors. These behaviors include *code-switching*, *code-mixing*, *borrowing* and other language practices (Ardila, 2005; Martin, Krishnamurthy, Bhardwaj, & Charles, 2003; Brice & Anderson, 1999). Code-switching occurs when a speaker switches languages between sentences or phrases (e.g. *Vamos al parque. Do you wanna play?*). Code-mixing involves mixing or alternating between two languages within a single sentence (e.g. *Veo un fish*). Finally, borrowed vocabulary or cultural loan words usually are L2 words that have no equivalence in the individual's L1; these words sometimes are specific to L2 regional or popular culture (e.g. *Me gusta la Barbie*). Bilingual behaviors in young children can be very perplexing to those unfamiliar with bilingual language development. Interventionists who have not had formal training in this area may be concerned that bilingual behaviors are indicative of language confusion. However, most researchers believe that these behaviors are not indicative of confusion or delay; rather they are common language features in bilingual populations (Brice &

Anderson, 1999; Patterson, 1999; Ardila, 2005; Toribio, 2004; Backus, 1999; Genesee, et al., 2004).

### Review of Relevant Studies

Through empirical research as well as case studies, researchers have attempted to better understand language behaviors in bilingual children. Variables that can affect children's language usage pattern include enrollment in English preschool programs; parental language practices; lack of interaction with peers in L1; and having siblings who speak L2 (Anderson, 2004). Researchers mostly have studied bilingual language behaviors in simultaneous bilinguals, with less attention given to this phenomenon in sequential bilinguals. A review of relevant studies that evaluate these patterns in young children is necessary to understand what is known about language stability profiles and bilingual language behaviors in young children.

#### *Language of Preschool Program*

In a seminal study that investigated the effects of preschool instruction on L1 language development, Wong Fillmore (1991) used parent interviews to measure patterns of language use in over 1,000 children. Spanish speakers accounted for over 75% of the sample, with the remaining families being of Asian, American Indian or other language backgrounds. Parent interviews elicited very specific information about adult and child language usage in the home, as well as questions about language used in preschool instruction. Children who were enrolled in preschool programs that used English, (either English only or English in addition to L1), were fifteen times more likely to shift toward English usage in the home than peers who were in L1 preschool programs. Interesting patterns also emerged in sibling language usage. Siblings of children who attended

preschool programs that used English were more likely to use English with their brothers and sisters, while over 75% of the siblings of children from L1 preschool classrooms used L1 in the home with their brothers and sisters.

Wong Fillmore's study contained a number of limitations. This study did not directly assess child language skills; formal assessments or language samples would have been better indicators of L1 attrition than parent report alone. Even if children who were exposed to English in preschool were more likely to use English with siblings, this does not necessarily indicate language attrition, especially in simultaneous bilingual children. These children may still use their L1 with parents or others at sufficient levels that L1 is maintained. Other researchers identified methodological issues in Wong Fillmore's study, including the use of convenience sampling, limited data about classroom language practices, and lack of direct assessment of participant L1 and L2 language skills (Rodriguez, Diaz, Duran, & Espinoza, 1995). Wong Fillmore's study also failed to consider the possibility that differing groups may have had differing language usage profiles. Despite these limitations this study presents interesting preliminary findings that suggest that language of preschool instruction impacts patterns of language usage in linguistically diverse families.

The implications of these changes in child language usage can be understood through Cummins' *Developmental Interdependence Hypothesis* (1979). According to Cummins, a child needs to develop a basal level of L1 competence in order to approach L2 learning. For young children who have not mastered their L1, early exposure and shift towards L2 may impede the development of both languages. This hypothesis and the

results from Wong Fillmore's study provide rationale for preschool programs to support children in developing an adequate base in L1 before extensive exposure to L2.

Some researchers have a different position on how preschool instruction that utilizes L2 influences language development. Winsler, Diaz, Espinoza, & Rodriguez (1999) completed a longitudinal study that described the language patterns of Spanish speaking children attending a bilingual preschool program. The participants in this study were 26 children of Mexican descent who attended all day preschool programs where teachers used Spanish for half of the day and English for the other half. Twenty younger siblings of preschoolers, none of whom were enrolled in preschool programs, served as a control group. Standardized measurements of Spanish and English language skills were collected at four time points over the course of two years. These results were at odds with Wong Fillmore's findings; both groups of children demonstrated significant growth over the two-year period in both English and Spanish language skills. However, the preschool group demonstrated significantly more advanced English skills than did the control group.

This study also had its limitations. In some respects the groups were not equivalent. The control group was on average four months younger than the preschool group and the preschool group entered the study with stronger English skills than the control group. In addition, the authors did not address how having an older sibling in preschool impacts language behaviors in young children. Nevertheless, the results suggest that bilingual preschool programs that provide 50% instruction in English and 50% in L1 do not contribute to L1 attrition; however, these programs do support L2 development. It is unclear whether these findings can be generalized to bilingual

classrooms with other proportions of language instruction or to L2 only classrooms; nor is it clear if children enrolled in half-day programs present with similar language outcomes as children in all day programs.

#### *Age of Second Language Acquisition*

Interesting findings about language patterns in young children have also been gleaned from studies of older children. Hakuta and D'Andrea (1992) studied the language usage patterns of 308 high school students of Mexican descent. To measure language usage patterns, the authors collected language measures in Spanish and English in addition to demographic information and specific language usage information. Hakuta and D'Andrea found that for students who were immigrants or first generation, Spanish proficiency was most related to the student's age at which he/she started speaking English. Students who were exposed to English at a younger age presented with weaker Spanish skills than students who were exposed to English later in childhood. Additionally, a student's maintenance of Spanish language skills was highly associated with adult language practices in the home. Students who had parents who spoke mainly Spanish in the home had stronger Spanish language skills than students whose parents spoke either Spanish and English or mostly English. One final finding was that students who were second generation or later (and presumably simultaneous bilinguals) demonstrated a clear shift towards choosing English to use with siblings and peers, and for academic purposes.

#### *Code-Switching and Code-Mixing*

Code-switching, the alternate usage of languages between sentences or phrases, and code-mixing, the alternate usage of languages within a single sentence, are common

bilingual behaviors. Code-switching and mixing have been considered by some as indicators of language deficiency, inadequacy, or deviancy (Fernandez, 1990; Poplack, 1980; Cheng & Butler, 1989). However, others have described these behaviors as normal, common, and occurring at all levels of language proficiency (Brice & Anderson, 1999). Adult bilinguals are known to use code-switching or code-mixing behaviors for social pragmatic reasons (e.g. humor, demonstrating membership, privacy, formal or informality etc.); however, children are not thought to completely acquire these intentional, sophisticated, social pragmatic types of behaviors until around five years of age (Meisel, 1994; Brice & Anderson, Genesee, Paradis, & Crago, 2004). Despite the fact that most bilingual children code-mix, this bilingual behavior is often a source of concern and misunderstanding (Genesee, Paradis, Crago). Several researchers have documented code-switching and mixing behaviors in young children through case studies or studies of small groups of children (Anderson, 1999a; Brice & Anderson, 1999; Turian & Altenberg, 1991; Orellana, 1994; Meisel, 1994, Rodriguez, Hammer, Miccio, & Aragon, 2005; Genesee, Nicoladis, & Paradis, 1995).

Two researchers studied code-switching in bilingual preschool aged children in play. Orellana (1994) studied the language of 3 simultaneous Spanish/English bilingual children during play. For each child, she collected and analyzed spontaneous language samples in a bilingual preschool setting and in the home. Interesting patterns emerged. Each of the children chose to use English during play schemas that involved popular culture characters (e.g. superheroes); however, when engaged in other play activities the children used Spanish. The author found no evidence to suggest that code-switching in these children was related to language attrition. This is not surprising given the children

in this study were simultaneous bilinguals who were from families that used both languages equally in the home.

Paugh (2005) conducted a similar study of 6 preschool-aged children from the West Indies who spoke English and Patwa. These children were also simultaneous bilinguals; however, English is the official language and tends to be the formal and stronger language, while Patwa serves as a communal and emotionally expressive language. Paugh found that although these children used increasingly more English, they tended to code-switch and code-mix into Patwa during play schemas that involved emulating adult figures from the community. The author suggested that the children's code-switching into Patwa likely will support the maintenance of Patwa.

Genesee, Nicoladis, and Paradis (1995) studied the language usage of 5 simultaneous bilingual 2-year-olds being raised in French-English bilingual environments. The children in this study had parents who were bilingual, however each parent used only their L1 (French or English) with their child. The authors took language samples to evaluate the child's language usage with each parent. The children used the appropriate language, each parent's L1, in correct contexts. This demonstrated that young simultaneous bilingual children are capable of managing bilingual language usage, including code-switching to an adult's L1 when appropriate, in different contexts. Researchers documented similar findings when children were placed with unfamiliar monolingual adults who spoke either English or French (Genesee, Boivin, & Nicoladis, 1996). It is uncertain however, if these findings can be generalized to sequential bilinguals.

Some researchers have described code-mixing as a more complex linguistic behavior than code-switching, since code-mixing requires the simultaneous coordination of semantic, syntactic, and morphological dimensions of both languages (Anderson, 2004; Grosjean, 1982; Lanza, 1992). Many of the code-mixing studies included children who were simultaneous bilinguals; Brice & Anderson, however, documented code-mixing behaviors in a successive bilingual preschool aged child over the course of 17 months. The researchers collected data during 10 sessions through videotaped and transcribed mother-child interactions; the child's mother in this study was a monolingual Spanish speaker. Analysis revealed no differences over time in code-mixing behaviors, with roughly 10% of the child's utterances involved code-mixing consistently over the course of the study. In addition, the child's code-mixing behavior appeared appropriate given that her audience was bilingual. This study did not allude to the relationship between code-mixing and language stability profiles.

In a study of 10 typically developing children from Spanish speaking families, Rodreguez, Hammer, Miccio, & Aragon (2005) documented code-mixing and code-switching behaviors after 1 and 2 years of Head Start preschool programming. The children were not exposed to English until they were enrolled in Head Start programs at 3 years of age. The children continued to speak Spanish in the classroom; however, the language of instruction was English. The authors collected language transcripts in contexts where English was elicited, and in contexts where Spanish was elicited. More code-switching behaviors were observed than code-mixing at both time points. Interestingly, after the second year of preschool enrollment, children began to code-switch and code-mix more when speaking Spanish than when speaking English. The

authors believed that this behavior may reflect the children's growing competency in English. However, no exploration of the possibility that children may also have been demonstrating L1 attrition was made.

Kaufman and Aronoff (1991) completed a case study similar to Brice and Anderson's with a sequential bilingual girl whose first language was Hebrew. The child was almost 3 years old at the beginning of the study, and her development was tracked over the course of 20 months. As the child's code-mixing behaviors increased, so did her error patterns in L1. By the end of this study, the authors believed that child's code-mixing behaviors were related to the child's increased exposure to L2 and may have been evidence of the child's L1 attrition. Despite this claim, there is a paucity of evidence to support the belief that code-mixing is related to L1 attrition. More studies are needed to investigate the relationship between code-mixing and L1 stability profiles. This information is important because it will help professionals understand this behavior in young bilingual children.

#### *Error Patterns and General Term Usage*

Researchers have described two other language behaviors in children experiencing language attrition, these include increased error patterns (Anderson 1999a; 1999b; Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000) and usage of general term/non-descriptive words (Anderson 1999a, 1999b). While these language behaviors have not received as much attention as other variables, they may provide insight into language maintenance and attrition in young sequential bilinguals.

Grammatical errors have been of interest to researchers studying SLI in Spanish speaking children for a number of years (for a review, see Restrepo & Gutiérrez-Clellen, 2004). In

a study of over 60 children Restrepo (1998) found that noun phrase errors were more common in Spanish speaking children with SLI. Still, only a few studies have documented error patterns in typically developing children experiencing L1 attrition. In a case study, Anderson (1999a) found that grammatical errors (e.g. errors in verb usage, as well as errors involving clitics, articles, and prepositions) were more frequent as the child became more proficient in her L2. However, there appears to be variability in error patterns across individual children. Anderson followed two bilingual children experiencing L1 loss (1999b) and found that a specific error pattern, such as gender agreement, was observed in only one of the children studied. This finding demonstrates the variability seen in the language behaviors of children experiencing L1 attrition. Anderson also documented lexical level loss and vocabulary loss as one of the children lost vocabulary in her L1 and began to increase her usage of general term/non-descriptive words such as *eso*, *esto*, *aca*, and *aqui* (1999a). None of the other studies reviewed documented error patterns and the use of general term/non-descriptive words in successive bilingual children and related these behaviors to language maintenance or attrition.

#### *Parent-Child Interactions*

Early parent-child interactions are thought to be the seedlings of many developmental processes that influence social, emotional, communicative, and cognitive development (Adamson & Russel, 1999; Sachs, 2005; Trevarthen, 1989; Tomasello, 1999). Early language development is thought to be supported through coordinated joint attention and maternal labeling behaviors (Cambel & Nanny, 2003; Tomasello).

Research involving European-Americans has demonstrated that maternal sensitivity and

responsiveness is predictive of linguistic communication in infants and toddlers (Carpenter, Nagell & Tomasello, 1998; Baumwell, Tamis-Lemonda & Bornstein, 1997). Nevertheless, there is an acknowledged need for research that describes mother-child interaction in diverse populations; much of the current literature describes these interactions in European-Americans (Hammer & Weiss, 1999). There is a growing body of literature which suggests that mother-child interactions are culturally specific and that these practices differ across cultures (Hammer & Weiss; Johnston & Anita Wong, 2002; Crago, 1992; Bakemann, Adamson, Kooner & Barr; 1990). Thus it is necessary to study individual groups when discussing the relationships between mother-child interactions and language outcomes.

A number of researchers have described parent-child interaction in Hispanic groups living in the United States (e.g. Puerto Rican and Dominican families; Calzada & Eyeberg, 2002; Fracasso, Busch-Rossnagel & Fisher, 1994; Gonzalez-Ramos, Zaya & Cohen, 1998). There is evidence from available research that suggests that while there may be similarities across Hispanic groups there also are significant differences (Calzada & Eyeberg), and thus each group should be considered individually. In addition, the methods of these studies varied tremendously; including differences in the age group of children studied, and the types of tools (e.g. parent-survey, child- survey, laboratory situations, etc.) used to measure parent-child interaction or relationship (Calzada & Eyeberg; Fracasso, Busch-Rossnagel & Fisher; Plunkett & Bamaca-Gomez, 2003; Gonzalez-Ramos, Zaya & Cohen). There is a growing body of research investigating parent-child interactions in Mexican populations. Given the scope of the current study these studies will be reviewed. In addition, only a small body of literature exists that

describes how language usage between parent and child is related to parent-child interactions. Given the paucity of research in language usage patterns between parent and child, the studies reviewed will include other cultural and linguistic groups.

A number of studies have described parent-child interactions in Mexican families. Solis-Camara and Fox (2001) used the Spanish translation of Parent Behavior Checklist (PBC; Fox, 1994) with 221 Mexican mothers of children between the ages of 1 and 5 years of age. The PBC contains 100 questions that fall into three subscales; expectations, discipline, and nurturing. No one specific pattern was found across the sample, however when family factors were considered a number of interesting findings emerged. For example, young Mexican mothers frequently used discipline and demonstrated less nurturing than older mothers. Nurturing was also found to be highly correlated with maternal level of education; lower levels of maternal education were related to lower level of maternal nurturing behaviors. These results were consistent with studies of mothers in the United States (Fox, Platz, & Bentley, 1995). However, in subsequent studies (Cardona, Nicholson, and Fox, 2000) researchers found that the PBC might not be sensitive to the types of nurturing behaviors that Hispanic mothers engage in with their children. For example, Mexican mothers are more likely to physically demonstrate nurturing behaviors (e.g. affection through hugging or kissing) rather than through material rewards. According to the authors, if this is the case then PBC is not a tool that is sensitive in capturing nurturing parenting behaviors typical in parent-child interactions in Hispanic families.

Hill, Bush, and Roosa (2003) administered surveys to parents and children to describe and compare the parent-child relationship in European-American ( $N=167$ ) and

Mexican-American ( $N=177$ ) families of low-income backgrounds. The children in this study were 8-13 years old. The Mexican-American group included Spanish speaking ( $N=93$ ) and English speaking ( $N=84$ ) families. The authors found that Spanish and English speaking Mexican-American mothers demonstrated similar levels of acceptance to their children; however, hostile control was seen more frequently in Spanish speaking mothers. The authors speculated that for Spanish speaking Mexican-American mothers the combination of hostile control and acceptance might be adaptive for families that are living in stressful or unfamiliar environments.

In a similar study, Varela and colleagues (2004) used surveys to study the interaction style of Mexican ( $N=49$ ), Mexican-immigrant ( $N=37$ ), Mexican American ( $N=13$ ), and European American parents of children between the ages of 10-14. The authors found that Mexican Americans and Mexican-Immigrants had a more authoritative interaction style than Mexicans living in Mexico or European-Americans. While this research group did not measure hostility, they were able to support Hill, Bush, and Roosa's findings that Mexican Americans and Mexican-immigrants displayed a parent-child interaction style that was characterized as controlling but accepting. The authors also suggested that this parenting style might be a result of having minority or immigrant status or as a result of living in environments that present other safety challenges.

There is a small body of literature that suggests that high levels of parent-child cohesion in immigrant populations are predictive of a child's L1 maintenance. Some researchers have described Mexican families as having a stronger sense of family cohesion than Euro-American families, and that family cohesion is likely stronger among less acculturated Mexican Americans than more acculturated Mexican Americans (Vega,

1990; Hill, Bush, & Roosa, 2003). However, there is a dearth of research that has investigated both L1 usage and family cohesion in Mexican immigrant populations, thus two studies of Chinese immigrants will be presented to further explore what is known about L1 usage and family cohesion.

Luo and Wiseman (2000) studied language usage and family cohesion of 250 Chinese immigrant families living in the United States. They employed questionnaires to measure family attitude towards L1 usage and intergenerational cohesiveness. Higher levels of mother-child cohesiveness, and grandparent-child cohesiveness were found to be predictive of a child's maintained L1; however, father-child cohesiveness was not predictive of a child's L1 maintenance. The authors speculated that mother-child cohesiveness may be more predictive of L1 maintenance because in Chinese culture mothers are thought of as emotionally-devoted care takers while fathers are considered stern and less available than mothers.

In a similar study of 40 Chinese immigrant families living in Australia, Tannenbaum and Howie (2002) found that the quality of affective relationships between parents and children in immigrant families was correlated with the children's L1 usage and preference. This finding supported the author's theory that children who feel part of a cohesive and unified family are more likely to maintain L1, whereas when children do not use their L1 with their family there is a greater likelihood of communication barriers, misunderstandings and conflict (Luo & Wiseman; Sridhar, 1988). This relationship between L1 language usage and higher levels of family cohesion has also been speculated to exist in Mexican immigrant populations (Hill, Bush, & Roosa, 2003); however additional research is needed in this area.

## Literature Review Summary

There is a growing body of research that investigates language stability profiles in bilingual children; yet there has been relatively little research that employs both behavioral measurements and questionnaires to investigate language patterns in young children of Mexican-immigrant backgrounds. None of the studies reviewed examined the relationship among all of these potential correlates of language stability profiles or between all of the correlates and language stability profile. The current available literature suggests that observed child language behaviors are not random; nonetheless, these behaviors have been understudied in successive bilinguals. In addition, the available studies that investigate observed language behaviors included mostly case studies of children seen at one or occasionally multiple time points, or several children seen at one time point. In order to relate these behaviors to language stability patterns, groups of children should be studied longitudinally. While parent-child interactions are important because they are thought to be an indicator of a healthy social emotional development in young children, little is known about parent-child interactions in Mexican-immigrants because researchers have obtained mixed results from questionnaire studies of such interactions (Hill, Bush & Roosa, 2003; Varela et al., 2004). Parent-child interactions in Mexican-immigrant populations could be better understood through structured observational measures, like that of Egeland and Heister's (1995). Finally, factors such as language usage between child and parents, preschool enrollment, and frequency of visits to Mexico likely influence language stability profiles in children of Mexican-immigrants. These types of family/child language usage and exposure patterns

are important socio-linguistic variables that should be further explored in conjunction with other variables of interest.

There is clearly a need for additional research that further investigates variables that affect language stability profiles and bilingual behaviors in young Mexican-immigrant children. Information from this proposed research will provide a more developed description of development in this population and will prove to be very valuable to early childhood interventionists, parents, and bilingual researchers.

## Chapter III

### Method

#### *Design*

A longitudinal design was employed to better understand Spanish language development and the language stability profiles of this sample of children of Mexican-immigrants. A quantitative approach was used; Spanish D change scores were regressed on hypothesized predictors of language attrition. In addition, language trajectories were plotted to describe the children's language development. Most analyses focused on Spanish language development from approximately three years to four years of age; however, exploratory and descriptive strategies were applied to portray the longitudinal development of the 10 subjects who remained in the sample at approximately 5 years of age. Table 1 displays predictor variables by category in the left column and outcome variables in the right column.

#### *Participants*

The data used in this dissertation were gathered as part of a longitudinal study of development in young, typically developing children of Mexican-immigrant background at the University of Colorado. The intent of the original study was to gather developmental norms on young Mexican-immigrant children and to develop a normative database that could be used in researching and evaluating development in deaf children from Mexican-immigrant families. The original sample included 85 subjects who were

Table 1. Predictor and Outcome Variables

<i>Predictor Variables</i>	<i>Outcome Variables</i>
<ol style="list-style-type: none"> <li>1. Observed language behaviors               <ol style="list-style-type: none"> <li>a. percentage of code-mixed utterances</li> <li>b. frequency count of Spanish general term/non-descriptive words</li> <li>c. percentage of utterances containing errors</li> </ol> </li> <li>2. Mother-child interaction at 33-37 months               <ol style="list-style-type: none"> <li>a. quality of relationship score</li> <li>b. maternal intrusiveness score</li> <li>c. maternal hostility score</li> </ol> </li> <li>3. Family/child language usage and exposure               <ol style="list-style-type: none"> <li>a. percentage of time mother uses Spanish</li> <li>b. percentage of time father uses Spanish</li> <li>c. percentage of time child uses Spanish</li> <li>d. number of older children in the home</li> <li>e. number of younger children in the home</li> <li>f. child's language usage with peers</li> <li>g. child's language usage with siblings</li> <li>h. preschool enrollment</li> <li>i. weeks spent in Mexico this year</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Spanish Lexical Diversity               <ol style="list-style-type: none"> <li>a. Spanish D at Time 1, 2, and 3</li> <li>b. Spanish D change score at Time</li> </ol> </li> <li>2. SLAP at Time 3               <ol style="list-style-type: none"> <li>a. expressive vocabulary raw score</li> <li>b. language subtest raw score</li> </ol> </li> </ol>

Table 2.

*Demographic Characteristics of Participant's Family*

Characteristic	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Mother's residence in the U.S.	5.68	2.38	1	8
Maternal education	7.68	2.79	1	11
Family income	1,254	460	600	2000

*Note.* Mother's residence in the U.S. = the amount of time the mother has resided in the United States; Family income = family's monthly income in dollars.

recruited through a Boulder, Colorado health care center that provides services in Spanish. The children were from Mexican-immigrant families that spoke Spanish as the primary language in the home. A non-probability subsample was employed for the current study; a sample of 19 children (10 girls and 9 boys) was selected based on availability of data at 33-37 months of age as well as at 48-49 months of age. Ten of these children (6 girls and 4 boys) also had data points at 59-61 months of age. All of the children were born in the United States; most of the mothers in the study had lived in the United States for five years or more. Demographic information is presented in Table 2.

*Data collection*

Home visits were conducted for all 19 children when the target child was 33-37 months old as well as at 48-49 months of age; 10 of these participants were also visited at 59-61 months of age. A non-structured, naturalistic parent-child interaction was

videotaped at each visit. In addition, parent surveys and child assessments were collected during the home visit.

*Language transcripts.* Native Spanish speaking graduate students in speech-language pathology transcribed the 25-minute mother-child videotaped interactions from each home visit. In order to allow the child and parent to adjust to being videotaped, the transcriptions did not begin until five minutes after the videotaping began. Transcriptions were entered into the CHAT format of the Child Language Data Exchange System (CHILDES, MacWhinney, 2000) language transcription program. Transcribers were trained and achieved 90% reliability prior to beginning coding independently; in addition every fifth tape that a transcriber completed was checked for reliability.

The CLAN system of CHILDES was employed to calculate a number of observed language behaviors that will be used as predictor variables at each of the three time points. These include Spanish D, MLUw, number of utterances code-mixed, number of utterances with errors produced, and number of Spanish general term/non-descriptive words used.

D is a measure of lexical diversity, a quantification of a speaker's active expressive vocabulary (Malvern & Richards, 2002). D is a relatively new language sample measure that demonstrates the ability to capture developmental trends in a variety of age groups, including young children from 18 months old to 5 years old (Duran, Malvern, Richards, & Chipere, 2004). Researchers have employed D to study a number of different languages, including Spanish, and they have used D to study bilingual populations (Duran, Malvern, Richards, & Chipere, 2004; Malvern & Richards). D has also been useful in studying populations with language vulnerabilities, including

individuals with SLI (Klee, Gavin, & Stokes, in press; Owen & Leonard, 2002; Klee, Stokes, Wong, Fletcher, & Gavin, 2004).

D is derived from an iterative process that begins with 35 ( $N=35$ ) randomly selected tokens and continues up to 50 ( $N=50$ ) tokens. For each iteration, a type/token ratio (TTR) is calculated by averaging the TTRs obtained from 100 randomly selected sub samples consisting of the number ( $N$ ) of tokens for that point (MacWhinney, 2000). Type/token ratios from each iteration and the number of tokens are plotted on a graph ( $N=35$ -  $N=50$ ). The final result is a curvilinear distribution. This distribution is compared to a probabilistic model of curvilinear TTR distributions and assigned a value: D (Duran, Malvern, Richards, & Chipere, 2004; Owen & Leonard, 2002; Richards & Malvern, 1997). A larger D results in a higher curve and greater lexical diversity (MacWhinney). Figure 1 is a model of TTR plotted against samples of increasing length for differing values of D created by Duran, Malvern, Richards, & Chipere.

D is calculated through the VOCD command of the CLAN program, and has demonstrated high levels of reliability. Split-half reliability procedures completed by one group of researchers (McKee, Malvern, & Richards, 2000) demonstrated that halved samples were not significantly different from analysis that included entire transcripts. A number of studies have also demonstrated that young children with higher mean length of utterance measures also have higher D scores (Klee, Gavin, & Stokes, in press; Owen & Leonard, 2002; Klee, Stokes, Wong, Fletcher, & Gavin, 2004).

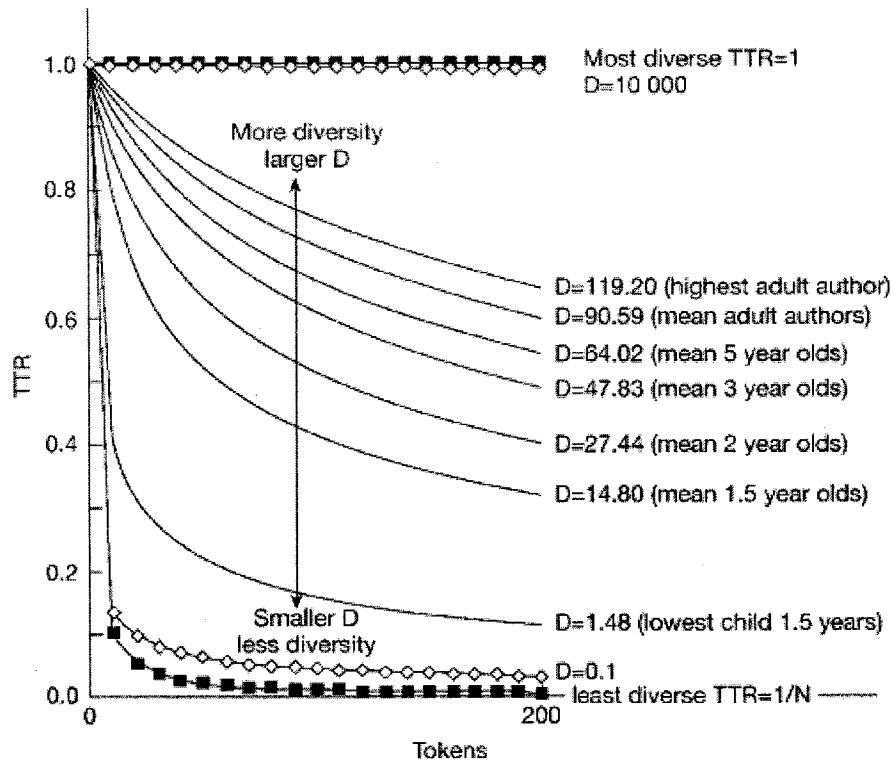


Figure 1. Model TTR plotted against samples of increasing length for different values of D (Duran, Malvern, Richards, & Chipere, 2004).

For the current study, D was used to measure lexical diversity of Spanish speaking children. Because the primary variable of interest is Spanish language development, Spanish D was calculated by using the VOCD command with Spanish words only. English words were excluded from the analyses. Spanish D was calculated at each time point for each participant. In addition, Time 2 change scores were calculated and reported; these scores were calculated by subtracting the Time 1 (33-37 months of age) Spanish D score from the Time 2 (48-49 months of age) Spanish D scores.

Researchers have described MLUw as a satisfactory language sample measure in younger preschool aged Spanish speaking children (Gutiérrez-Clellen, Restrepo, Bedore,

Peña, & Anderson, 2000). In order to provide an additional estimate of the reliability of Spanish D for the current study, MLUw was calculated at Time 1 for each participant and compared to Time 1 Spanish D scores. MLUw was not selected as a measurement to be used throughout this study because MLU measurements are thought to present with limitations once children progress beyond 3.5 morphemes per sentence (Ratner & Menn, 2000; Tager-Flusberg, 2005). Four and five year olds typically have progressed beyond 3.5 morphemes per sentence (Miller & Chapman, 1981), thus MLU would not be an ideal measure for the current study, which includes time points at four and five year of age for some subjects. D does not present with this limitation, D is thought to capture lexical development and diversity in both young speakers and mature speakers (Malvern & Richards, 2002; Duran, Malvern, Richards, & Chipere, 2004). Thus Spanish D was selected to be used at all three time points.

Established coding practices described in earlier studies (Brice & Anderson, 1999; Anderson, 1999a) were applied to calculate code-mixing behaviors. Code-mixing, the mixing or alternating between two languages within a single utterance of more than a single word (e.g. *aquí hay un fish*), was coded and counted. Counting the total number of code-mixed utterances and dividing that by total number of utterances yielded a percentage of code-mixed utterances.

A frequency count of the total number of Spanish general term/non-descriptive words, as described by Anderson (1999a), was also obtained; these included the following words: *éso, ésa, esto, esta, este, aquí, acá, allá, and allí*. This finite list of general term/non-descriptive words was adapted from Anderson's work, and includes demonstrative pronouns and place adverbs.

Finally, native Spanish speaking transcribers coded utterances containing grammatical errors at the time of transcription. Transcribers coded these errors by entering an error code and specifying the child's error (e.g. *child used un pelota for una pelota*). The percentage of errors was calculated by dividing the number of utterances with errors by the total number of utterances.

*Mother-child interaction.* Mother-child interactions were described using a modified version of Egeland and Heister's (1995) coding system. This coding system was designed to describe quality of interaction and the affective valence of mother-child interactions during play or other activities. In the original coding system, these play interactions lasted up to 25 minutes (Egeland & Heister). However, in subsequent studies researchers have applied this system to 15 minutes of play interactions (NICHD Early Child Care Research Network, 2003). In the current study only 6 of the 19 videos contained the entire 25 minute video taped session with the target child and mother only; the other 13 videos included sections of the tape in which additional family members including siblings, aunts, uncles, grandparents, and other children and adults were present and interacting with the child or the mother. However, each of the videotapes contained at least 10 consecutive minutes that were dyadic in nature and included the target child and mother without extraneous interruptions. In order to maintain uniform coding practices across tapes and because Egeland and Heister's coding system was intended to measure dyadic mother-child interactions, only the 10 minutes of videotaped dyadic mother-child interaction were coded. However, five of the tapes that contain the entire 25 minutes in dyadic mother-child interaction were coded in their entirety in order to determine if the 10 minute coded interactions yielded results similar to the 25 minute

coded interactions. The values obtained from the 10 minute and 25 minute coded interactions were highly correlated (.94), indicating that the 10 minute segment reliably captured the information obtained from the full 25 minute interaction.

Egeland and Heister's scales were used with young children (36-42 months of age) and were useful in yielding predictor variables for longitudinal studies investigating mother-child interactions (Egeland & Hiester, 1995; NICHD Early Child Care Research Network, 2003). Both of the aforementioned studies employed one or two of the subscales that are available through this coding system, or converted subscales to composite scores. Each item is rated by the coder, based on the observed behavior, on 7 point Likert scales.

The current study assessed three subscales at 33-37 months of age; these subscales are presented in Table 3. Raw subscale scores were used as predictor variables. Interrater-reliability was calculated in the original study ( $N=283$ ) using intraclass correlations for each of the scales (Quality of Relationship = 0.82, Maternal Intrusiveness = 0.80, Maternal Hostility = 0.81; Egeland, 1993). All three of these scales were used as predictor variables.

The *maternal intrusiveness* scale is designed to assess the mother's style in allowing the child to gain autonomy and self-awareness and quantifies how much the mother interferes with her child's needs, desires, interest, and actual behaviors. This scale also quantifies how directive the mother is, for example, how much the mother physically manipulates the child's body to achieve goals or how much independence the mother provides her child.

Table 3

*Three Subscales of Egeland and Heister's Mother-child Coding System*

Score	<u>Quality of relationship</u>	<u>Maternal Intrusiveness</u>	<u>Maternal Hostility</u>
1	None/Very Low	No Intrusiveness	Very Low
2	Low	Very Low	Low
3	Moderately Low	Moderately Low	Moderately Low
4	Moderate	Moderate	Moderate
5	Moderately High	Moderately High	Moderately High
6	High	High	High
7	Very High	Very High	Very High

The *quality of relationship* scale is a global scale that focuses on the qualitative elements of the dyad, including affective and reciprocity aspects of the mother-child interaction. The *maternal hostility* scale indexes the valence of the mother's affect expressed toward the child. A mother who shows high levels of support would receive a score of 1- *Very Low* on the maternal hostility scale, while a mother who demonstrates evidence of rejection, anger, or frustration would receive a score of 4-*Moderate* on the maternal hostility scale. It should be noted that the term *maternal hostility* may sound potentially invasive or abusive; however, hostility is used in a general sense of the emotional coloring of a mother's interaction with her child. It is important to remember that this coding system was applied to naturalistic mother-child interactions that were collected a number of years ago; thus there was no potential of exposing the subjects to

any level of harm through this coding. In addition, this author has no subject identifying or contact information, thus parents and children were not informed about the results of this coding system.

Two coders, a bilingual speech-language pathologist, and a bilingual elementary teacher of Mexican descent, completed an extensive coding training. This training included viewing, scoring, and discussing practice tapes. Coders obtained acceptable reliability (Maternal Intrusiveness,  $\kappa = .87$ ; Maternal Hostility,  $\kappa = 1.0$ ; Quality of Relationship,  $\kappa = .90$ ) on 4 tapes of children 33-37 months of age; comparable reliability rates were achieved in former studies using this coding system (Egeland & Hiester, 1995; NICHD Early Child Care Research Network, 2003). Once this reliability was established, coders coded the 19 videotaped interactions of the subjects at the first time point.

Coding practices that have been established by the creator of this system and that have been used in early studies were followed in the current study (Egeland & Heister, 1995; NICHD Early Child Care Research Network, 2003). For example, coding occurred after a single viewing of videotaped interaction. Both coders coded every fourth tape in order to check for consensus in coding practices and coding reliability, acceptable reliability was obtained for these tapes (Maternal Intrusiveness,  $\kappa = .81$ ; Maternal Hostility,  $\kappa = 1.0$ ; Quality of Relationship,  $\kappa = .87$ ). Any disagreements were resolved through discussion, review of coding sheets, notes, and/or watching actual segments of the videotape.

Interactions for Time 2 were not coded for these variables primarily because the coding system has not been used with children over 42 months of age; in addition the videotaped interactions of the children at Time 2 rarely included even 10 minutes of

uninterrupted mother-child only interaction, and frequently included interactions with other children or adults in the home.

*Demographic Questionnaire.* A modification of Mattes and Santiago's (1995) Bilingual Proficiency Questionnaire was used to gain detailed information about family and child language usage, as well as demographic information. The questionnaire is an unstandardized, open-ended interview instrument that was designed to lead an interviewer through relevant language history questions. The creators of this questionnaire performed no statistical tests of reliability or validity. This questionnaire was used at each home visit, and included information about family members living in the home, family/child language exposure and usage information, as well as paternal and maternal education and occupation. The information from this questionnaire was used to determine family language usage patterns and SES. It should be noted that all of the mothers in this study reported using Spanish only with their children and were from limited educational and lower economic backgrounds, so there was homogeneity with respect to these variables.

Specific questions about language usage included *What percentage of the time does the mother speak Spanish with the child?*, *What percentage of the time does the father speak Spanish to the child?*, and *What percentage of the time does the child speak Spanish with his/her parents?* These data were recorded as percentages. In addition, number of older children and younger children living in the home was recorded; this included cousins and other children who might be living in the child's home. The target child's language usage with peers and siblings was also collected from the questionnaire, these responses were recorded separately and coded (e.g. English-1, Spanish+ English- 2,

Spanish –3). Preschool enrollment was also documented through the questionnaire and will be used in analysis; none of the parents indicated that their children were enrolled in preschool programs that used Spanish only. Several indicated that their children were in bilingual settings, and most indicated that their children were enrolled in preschools that used English. Yet, on a separate question these parents indicated that their children were exposed to Spanish at school. Some researchers have stated that these types of questions are confusing to parents, in part because parents may not know how languages are being used in the classroom (Rodriguez, Diaz, Duran, & Espinoza, 1995). However, based upon participant responses it appears safe to assume that the children enrolled in preschools were exposed to some level of English instruction (either English+Spanish or English only). Even students who were enrolled in preschool programs that used English only may have had Spanish speaking classmates.

For the current study, preschool enrollment was coded as enrolled (1) or not enrolled (0). Parents were also asked to indicate if they visited Mexico with their child and how long they tended to stay; this was reported in number of weeks spent in Mexico each year.

*Minnesota Child Development Inventory (MCDI) – Comprehension conceptual subscale.* The MCDI is a standardized parent questionnaire that assesses general development in children from 6- 78 months of age (Ireton & Thwing, 1974). The MCDI is often preferred over other tools because it is less invasive than direct child assessments and it is relatively easy for parents to complete. A number of researchers have found that the MCDI is a valid tool for screening the developmental status of young children (Gottfried, Guerin, Spencer & Meyer, 1984; Chafee, Cunningham, Secord-Gilbert,

Elbard, & Richards, 1990). It is not uncommon for researchers to choose one subscale of the MCDI to measure the development of specific skills (Pipp-Siegel, Sedey, VanLeeuwen, & Yoshinaga-Itano 2003; Chaffee, Cunningham, Secord-Gilbert, Elbard & Richards; Gottfried, et al.). For the current study, the comprehension conceptual (CC) subscale was chosen because it contains more items that measure development from 36 to 78 months of age than the expressive language subscale. In addition, the CC subscale is a more global measurement of language development, including elements of comprehension and expression. Further, only 4 of the 54 expressive subscale items are designed for children past 36 months of age; children older than this would reach the upper limits of the subscale. Thus, the expressive subscale is unsuitable to quantify longitudinal development in children at 36- 60 months of age, and will not be included in this study.

Early studies demonstrated that the CC subscale is a reliable, highly age-discriminating scale that provides a valid measure of language development for children up to age six (Ireton & Thwing, 1972). The authors of the MCDI reported split-half reliability by age group for the normative sample; the reliability of the CC subscale ranges from .93 for subjects aged 36-41 months to .79 for children 60-65 months (median = .89; Ireton & Thwing, 1974). Studies that evaluated the validity of the MCDI have revealed that the MCDI CC subscale is significantly correlated with the McCarthy Scale of Children's Abilities ( $r = .62$ ; Gottfried, Guerin, Spencer & Meyer, 1984), the Reynell Developmental Comprehension subscale ( $r = .52$ ; Chaffee, Cunningham, Secord-Gilber, Elbard & Richards, 1990) as well as the Preschool Language Scale ( $r = .60$ ; deAyora & White, 1987).

The CC subscale contains 67 items that index language comprehension (e.g. *Knows the meaning of same and different*) as well as concept formulation and expression (e.g. *Talks in past tense correctly*). The subscale name, comprehension conceptual, is somewhat misleading because it indicates that the subscale is one of comprehension; however, a review of this subscale revealed that 39 of the 67 items appear to have an expressive component (e.g. *Uses the words fast and slow correctly, Asks the meanings of words, Names the days of the week in correct order*). These items were intended to measure concept development; nonetheless, they are also expressive in nature. Given this information, it seems that it would be safe to consider the CC subscale as a general language development measure that includes both expressive and receptive elements.

The original MCDI normative sample was rather homogenous and included 796 children of white middle-class background. While the creators of the MCDI advised practitioners to use caution when using the tool with other populations, they also encouraged researchers to use the MCDI with diverse groups so that additional developmental normative behaviors could be obtained for differing groups (Ireton & Thwing, 1974). A University of Colorado research team undertook the endeavor of using the MCDI with Mexican-immigrant families. A team of native Spanish speaking professionals, parents, and graduate students modified and translated the MCDI so that it could be used with this population. The team adjusted for cultural and linguistic differences as needed; for example the item “*plays pat-a-cake*” was modified to “*juega a las palmitas,*” a culturally and developmentally appropriate modification of this item. Preliminary analysis of 9-33 month olds revealed that the translated version of the MCDI yielded higher mean scores than the comparison group; however, it also was sensitive to

development and growth over time (Jancosek, Miron & Yeigan Kuzcun, 1998). Given that only the Mexican-immigrant population was included in this study, and no comparisons will be made to other populations, the possible differences in mean level should not be a concern in this study. For the current study, the Spanish version of the MCDI-CC was administered and the normative data from the original MCDI applied to determine if the subjects presented with typical language development at the onset of the study. MCDI-CC age equivalency scores were recorded for all subjects at Time 1.

*Spanish Language Assessment Procedure-Third Edition (SLAP)*. The SLAP (Mattes, 1995) is a Spanish language assessment that measures both expressive vocabulary and the ability to comprehend and use language in structured academic tasks. Raw scores for both the expressive vocabulary subtest and the language subtests were recorded and considered as outcome variables for the 10 children seen at the third time point. These scores were compared to the Spanish D values obtained and additional qualitative analyses were completed to describe individual Spanish language trajectories and language stability profiles.

The SLAP was created to use with preschool and primary aged children; however, the test contains no developmental norms, standard scores, reliability, or validity information. The test was field-tested in public schools in the United States with native Spanish speaking and bilingual children, and the creator of the test encourages clinicians using the SLAP to collect local normative data to use in their communities (Mattes, 1995). The SLAP can be used to observe a child's language and behaviors during structured tasks; this type of assessment is has been recommended when normative tests

are not available for language minority populations (Peña, Iglesias, & Lidz, 2001; Gutiérrez-Clellen & Peña, 2001).

A stimulus manual that includes black and white pictures is used for the expressive vocabulary subtest and for some of the expressive language subtest items. The remaining language items are administered orally. The SLAP contains two subtests: expressive vocabulary and language. The expressive vocabulary subtest includes the ability to name pictures of 80 items within 12 categories (e.g. food, furniture, clothing, shapes, colors). Subjects were presented with a page that contained drawings of 12 items that belonged to a category and were asked to name each item in Spanish. The expressive vocabulary items on the SLAP are comparable to other child assessments such as the Peabody Picture Vocabulary Test and the Preschool Language Scale.

The language subtest measures both receptive and expressive language as well as concept development. Language items fall into the following 7 subsets: *describes noun function, comprehends spatial concepts, describes differences between objects, makes inferences, predicts outcomes, follows instructions in sequence, and retells short stories.* The language subtests items are comparable to items seen in the Preschool Language Scale and the Clinical Evaluation of Language Foundations. The language items increase in difficulty; if a child failed to answer any of the items within a set, testing was discontinued. Raw scores for the language items were calculated for each subject. Five of the 10 children did not receive basal scores that were necessary in order to advance through all of the language subsets of the language subtest because of their failure to answer items. For the present study a native Spanish speaking speech-language graduate student administered the SLAP to the 10 subjects seen at the third time point after

acclimating and playing with each child, using Spanish, for 10-15 minutes. The SLAP was administered in Spanish; if a child provided an answer in English he or she was politely prompted to provide the answer in Spanish. Spanish responses were calculated, and regional or dialectal variations of these items were accepted as correct. Five of the 10 subjects provided some answers in English; in most cases this involved 1 or 2 responses in English. These English responses were recorded, however, language maintenance requires the continued usage of L1, thus these responses were not counted towards correct Spanish responses. One of the subjects would only speak English with the examiner, even after being prompted by the native Spanish speaking examiner to use Spanish. This subject's English responses were recorded, but were not counted towards her raw score.

#### *Data Analysis*

The Statistical Package for Social Sciences software program, SPSS 13.0 (2004) was used to calculate means, standard deviations, correlations, multiple regressions and other statistics, as follows:

#### *Steps of analysis for hypothesis testing.*

1. Pearson correlations were calculated between predictor variables at Time 1 and between predictor variables and the outcome variable. Predictor variables were considered in sets: observed child language behavior variables, mother-child interaction variables, and family/child language usage and exposure variables. Correlation values for predictor variables within a set were examined in order to guard against multicollinearity; variables that were highly related ( $r = .6$ ) were examined; if there was

sound theoretical reasoning to view these variables as conceptually similar, an aggregate variable was created for these variables so as to reduce the number of predictors, reduce the likelihood of multicollinearity, and provide more stable estimates of the constructs. Predictors also were aggregated if distributional difficulties and/or zero order correlations suggested that the separate variables would not be useful as predictors of the dependent variable.

2. Regression was employed in order to understand how predictor variables were related to Spanish D change scores. Predictor variables were considered in sets: observed child language behaviors variables, mother-child interaction variables, and family/child language usage and exposure variables. Thus, three separate multiple regressions were attempted; an additional forced entry regression was completed with the variables that were most predictive of Spanish D change scores. The criterion of tolerance  $> 1-R^2$  was selected to determine reasonable degree of freedom from multicollinearity for regressions.

In addition to these analyses used to address specific hypotheses, analyses to address nondirectional research questions were performed and descriptive analyses were completed to describe the 10 subjects that were seen at the third time point. Single developmental language trajectories were plotted for each subject; in addition an average trajectory was plotted for the group. Individual trajectories were analyzed to determine if there was evidence suggesting that a child demonstrated language maintenance or language attrition. Language stability profile groups were then be formed and examined

separately; characteristics seen in these groups, such as performance on the SLAP, observed child language behaviors, family/child language usage and exposure, and other variables were explored.

## Chapter IV

### Results

The purpose of this study was to describe the Spanish language trajectories of a group of children of Mexican-immigrant descent and to describe predictors of language maintenance versus attrition in this population. Specifically, this study investigated the relationship between observed child language behaviors, mother-child interaction characteristics, and family/child language usage and exposure factors, on the one hand; and change in Spanish lexical diversity in preschool aged children. Regression models were employed to explore how groupings and combinations of variables were related to the outcome variable. And finally, exploratory descriptive analyses were conducted and language trajectories plotted for subjects seen at all three time points.

#### *Descriptive Statistics*

Means and standard deviations were calculated for the child language behavior variables, family/child language usage and exposure variables, and Spanish D at Time 1 ( $N = 19$ , 33-37 months of age), Time 2 ( $N = 19$ , 48-49 months of age) and Time 3 ( $N = 10$ , 59-61 months of age). Table 4 presents child language behavior variables. It should be noted that percentage of code-mixed utterances was not normally distributed; over half of the participants did not code-mix at Time 1 and Time 2. Thus, the means and standard deviations reported for percentage of code-mixed utterances should be interpreted with caution. More variability was seen, however, in the percentage of utterances containing

Table 4

*Means and Standard Deviations of Observed Child Language Behaviors Across Time Points*

Variable	<u>Time 1</u>		<u>Time 2</u>		<u>Time 3</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
% Code-mixed	1	2	1	2	2	3
% Errors	2	1	2	2	4	5
# General terms	24	19	31	22	32	17

*Note.* % Code-mixed = the percentage of utterances code mixed; % Errors = the percentage of utterances with errors; # General terms = the number of general term/non-descriptive words.

errors, only one participant at Time 1 and 2 committed no grammatical errors. At Time 3, one participant made markedly more errors than the other children, this is reflected in the higher mean and standard deviation reported. This should not be problematic given the descriptive nature of the analysis involving data from the third time points. Table 5 presents family/child language usage and exposure variables, and Spanish D is presented in Table 6. Mother-child interaction coding was completed at Time 1 only (33-37 months of age); Table 7 presents the means and standard deviations for these variables.

Table 5

*Means and Standard Deviations of Family/child language Usage and Exposure Variables at all Three Time Points*

Variable	<u>Time 1</u>		<u>Time 2</u>		<u>Time 3</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
% Spanish mother	98	4	98	4	97	5
% Spanish father	97	12	98	5	99	03
% Spanish child	97	7	92	13	86	16
# Older children	1.05	1.02	1.11	.99	1.00	1.24
# Young children	.58	.69	.79	.63	1.00	.67
Sibling language	2.9	.25	2.8	.40	2.6	.70
Peer language	2.7	.67	2.7	.48	2.4	.84
Preschool	.26	.45	.58	.51	.60	.52
Weeks in Mexico	1.5	4.0	1.4	4.0	.60	1.3

*Note.* Peer language and Sibling language usage values are based on a 3 point scale (1= English, 2 = Spanish+English, 3= Spanish). Sibling language = child's language usage with siblings; Peer language = child's language usage with peers; # Older children = number of older children in the home; # Young children = number of younger children in the home; Preschool = preschool enrollment; Weeks in Mexico = number of weeks spent in Mexico in the last year.

Table 6

*Mean and Standard Deviations for Spanish D at all Three Time Points*

Variable	<u>Time 1</u>		<u>Time 2</u>		<u>Time 3</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Spanish D score	38.87	16.16	46.87	16.06	55.45	22.59

Table 7

*Means and Standard Deviations of Mother-child Interaction Coding*

Category	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Intrusiveness	3.3	1.5	1	6
Hostility	1.5	.77	1	4
Quality of Relation.	4.2	1.2	3	7

*Note.* Intrusiveness = maternal intrusiveness; Hostility = maternal hostility; Quality of Relation = Quality of Relationship.

Two additional measures provided useful information about the children's language skills and Spanish D as a language measure, the MCDI and MLUw. The Spanish version of the MCDI-CC was used at Time 1 (33-37 months of age) to determine if the subjects presented with typical language development. MCDI-CC age equivalency scores in months based on the original norms were calculated for all subjects; the results demonstrated that the children were functioning near or above their age level in the area of language development ( $M = 39.7$  months,  $SD = 8.6$ ). In addition, all subjects in the current subsample had MCDI-CC scores at Time 1 that were within one standard deviation of the mean obtained from the larger sample of children between the ages of 33-37 months of age ( $N = 57$ ,  $M = 36.7$  months,  $SD = 9.68$ ). In order to assess how MLUw compared with Spanish D as a language sample measure at Time 1, as posited in the fourth research question, a Pearson correlation was calculated between MLUw and Spanish D at Time 1. These measures were highly correlated ( $r = .82$ ,  $p < .001$ ), providing preliminary support suggesting that Spanish D was a valid measure of lexical development with children between 33-37 months of age. Figure 2 presents the correlation between MLUw at Time 1 and Spanish D at Time 1. MLUw was not calculated at the second or third time point because of the known limitations that this measurement has in describing development in older preschool aged children (Ratner & Menn, 2000; Tager-Flusberg, 2005; Miller & Chapman, 1981). Spanish D does not present with this limitation in capturing lexical diversity throughout development, and thus was reported at each time point (Malvern & Richards, 2002; Duran, Malvern, Richards, & Chipere, 2004).

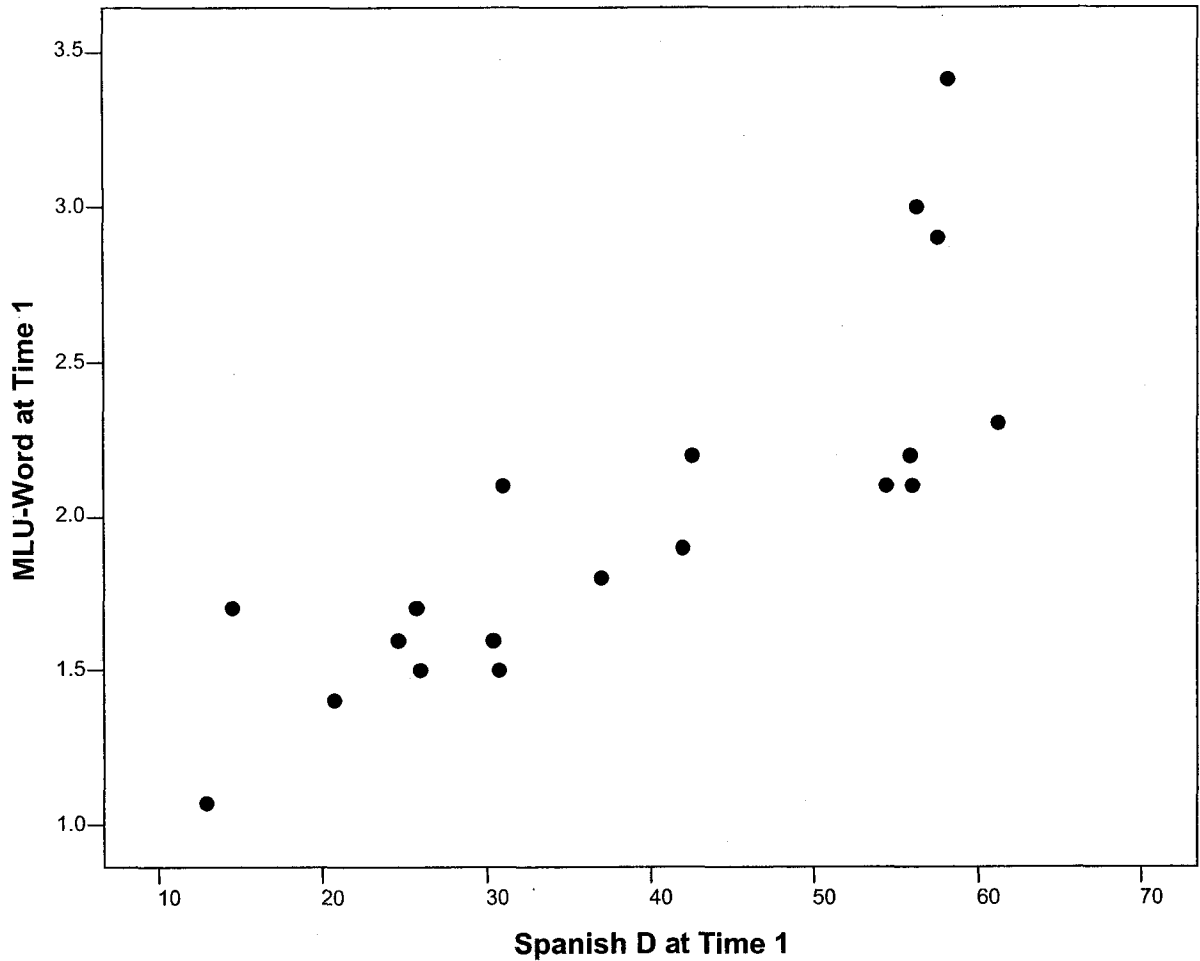


Figure 2. Correlation between MLUw and Spanish D at Time 1.

*Observed Child Language Behaviors*

The following research questions and hypotheses are addressed in this section:

Question 1. How do the observed child language behaviors of code-mixing, use of general term/non-descriptive words, and percentage of errors, change over time in young children of Mexican-immigrants?

Hypothesis 1a. The percentage of code-mixed utterances will not be associated with Spanish D change scores over and above the contribution of other predictors.

Hypothesis 1b. The percentage of utterances containing errors will be negatively associated with Spanish D change scores.

Hypothesis 1c. The frequency count of Spanish general term/non-descriptive words will be negatively associated with Spanish D change scores.

To address the first question, trends in observed child language behaviors were explored. Separate paired t tests compared Time 1 to Time 2 and Time 2 to Time 3 so as to be able to include all participants in the analysis of change from Time 1 to Time 2 despite the loss of participants from Time 2 to Time 3. Table 8 presents the results of the paired samples t test used to compare Time 1 to Time 2 observed child language behaviors. Table 9 presents the same analyses with Time 2 to Time 3 observed child language behaviors. These analyses revealed no significant differences between Time 1 and Time 2 or Time 2 and Time 3. The group mean demonstrated that between 1-2% of utterances were code-mixed across time points; however, over half of the children did not code-mix at Time 1 or Time 2. There was a slight increase in grammatical errors at the third time point; even so, this increase was not significant and was influenced by an outlier. The use of general term/non descriptive words increased non-significantly across time points.

Table 8

*Differences between Time 1 and Time 2 Observed Child Language Behaviors*

Variable	<u>Time 1</u>		<u>Time 2</u>		<i>t</i> (18)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
% Code-mixed	1	2	1	2	-0.79
% Errors	2	1	2	2	-0.69
# General term	24	19	31	22	-0.93

*Note.* % Code-mixed = the percentage of utterances code mixed; % Errors = the percentage of utterances with errors; # General terms = the number of general term/non-descriptive words.

\**p* < .05.

Table 9

*Differences between Time 2 and Time 3 Observed Child Language Behaviors*

Variable	<u>Time 2</u>		<u>Time 3</u>		<i>t</i> (9)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
% Code-mixed	1	3	.02	.03	-1.16
% Errors	2	3	.04	.05	-0.75
# General term	22	11	32	17	-1.70

*Note.* % Code-mixed = the percentage of utterances code mixed; % Errors = the percentage of utterances with errors; # General terms = the number of general term/non-descriptive words.

\**p* < .05.

To determine the correlations among predictors (so as to assess likelihood of problems with multicollinearity) and between each predictor and the dependent variable, Spanish D change score (to enable comparison of zero order correlations to the Betas in the multiple regression and to eliminate variables that are uncorrelated with the dependent variable), Time 1 percentage of code-mixed utterances, Time 1 percentage of errors, Time 1 number of general term/non-descriptive words, and Spanish D change score from Time 1 to Time 2 were related using Pearson correlations. Table 10 presents the results of these analyses. These correlations indicated that there were low to moderate correlations among predictors, suggesting little likelihood of problems with multicollinearity, but that use of general term/non descriptive words was unlikely to contribute to the multiple regression predicting Spanish D growth. Given that over half of the participants did not code-mix at Time 1, an additional correlation that included

Table 10

*Correlations between Spanish D Change Score and Observed Child Language Behaviors*

Measure	1	2	3
Span D change	-.14	-.65**	.08
1. % Code-Mix	—	.05	-.18
2. % Errors		—	-.32
3. # General term			—

Note. \*\* $p < .01$ .

only children who code-mixed was calculated to investigate if Spanish D change score was related to code-mixing. These exploratory analyses reflected what other studies have demonstrated; code-mixing was not related to Spanish D change scores ( $N = 9, r = -.07$ ).

A multiple regression was then calculated to examine the ability of the observed child language behaviors to predict Spanish D growth scores. A forced entry model was employed in which percentage of code-mixing, percentage of errors, and number of general term/non-descriptive words at Time 1 were entered simultaneously as predictor variables. Table 11 presents values obtained. Observed child language behaviors accounted for 36% of the variance in Spanish D change scores. Tolerance levels were acceptable for each of the predictor variables, suggesting, as predicted, that multicollinearity was not a problem. Of the three observed child language behaviors, percentage of errors was the only variable that was a significant predictor of Spanish D change scores ( $p < .05$ ), however the 3 observed child language behaviors collectively significantly predict Spanish D change scores,  $F(3, 15) = 4.30, p < .05$ .

Table 11

*Regression Analysis Summary for Observed Child Language Behaviors Predicting Spanish D Change Score*

Variable	B	SEB	$\beta$
1. % Code-Mix	-.18	.24	-.14
2. % Errors	-.11	.30	-.70*
3. # General term	-.18	.22	-.16

Note.  $R^2 = .36 (N = 19)$ .

\* $p < .01$ .

### *Mother-child Interaction*

The following research questions and hypotheses pertaining to mother-child interaction and Spanish D growth are addressed in this section:

Question 2. What interaction patterns predominate in the mother-child dyads of Mexican-immigrants at 33-37 months of age?

Hypothesis 2a. Maternal intrusiveness will be negatively associated with Spanish D change scores.

Hypothesis 2b. Maternal hostility will be negatively associated with Spanish D change scores.

Hypothesis 2c. Quality of relationship will be positively associated with Spanish D change scores.

To answer the second question, means and standard deviations for the three mother-child interaction variables were calculated. Table 5 presents the results. In addition, three bar charts were employed to display the distribution of values that were obtained for each of the three variables of interest. Figure 3 presents the distribution of maternal intrusiveness. The mothers in this study demonstrated a variety of levels of maternal intrusiveness; very low intrusiveness was most common. Figure 4 presents the distribution of maternal hostility. Maternal hostility was very tightly distributed with minimal variation. Over 95% of the mothers demonstrated *Very Low* to *Low* levels of maternal hostility. Figure 5 presents the distribution of quality of relationship. The quality of relationship observed again showed restricted variability, with no dyads showing very low or low relationship quality, the majority of dyads (57%) demonstrating

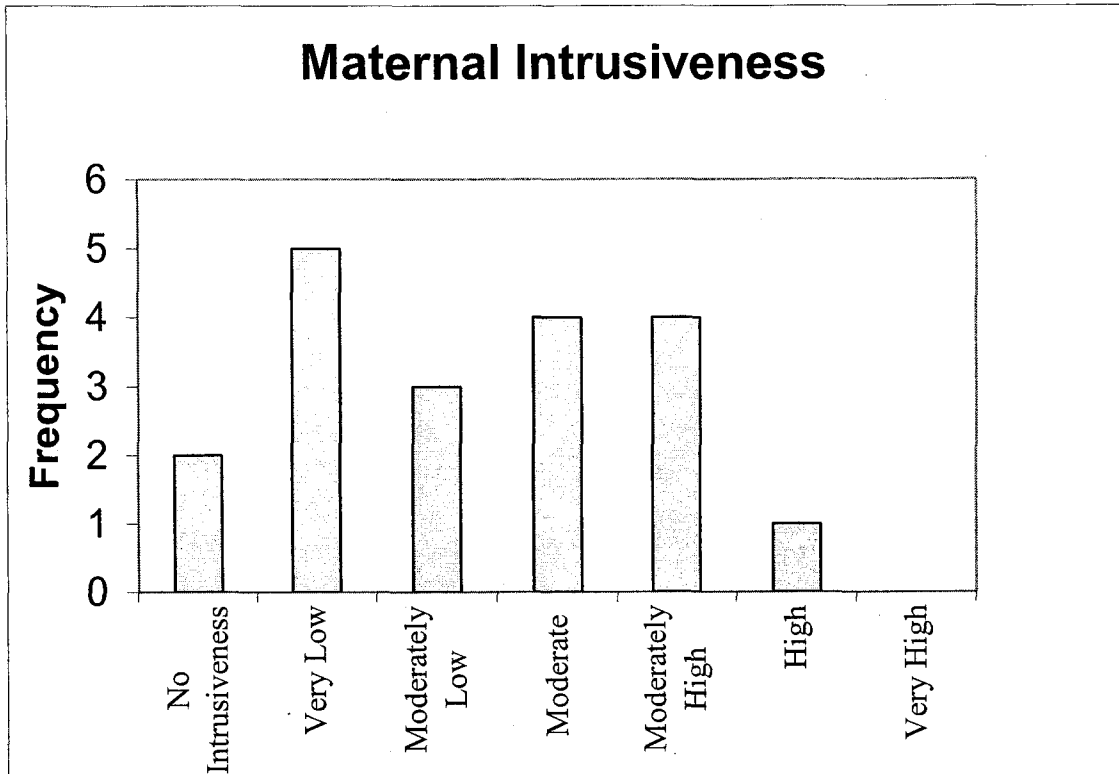


Figure 3. Maternal intrusiveness values observed at Time 1

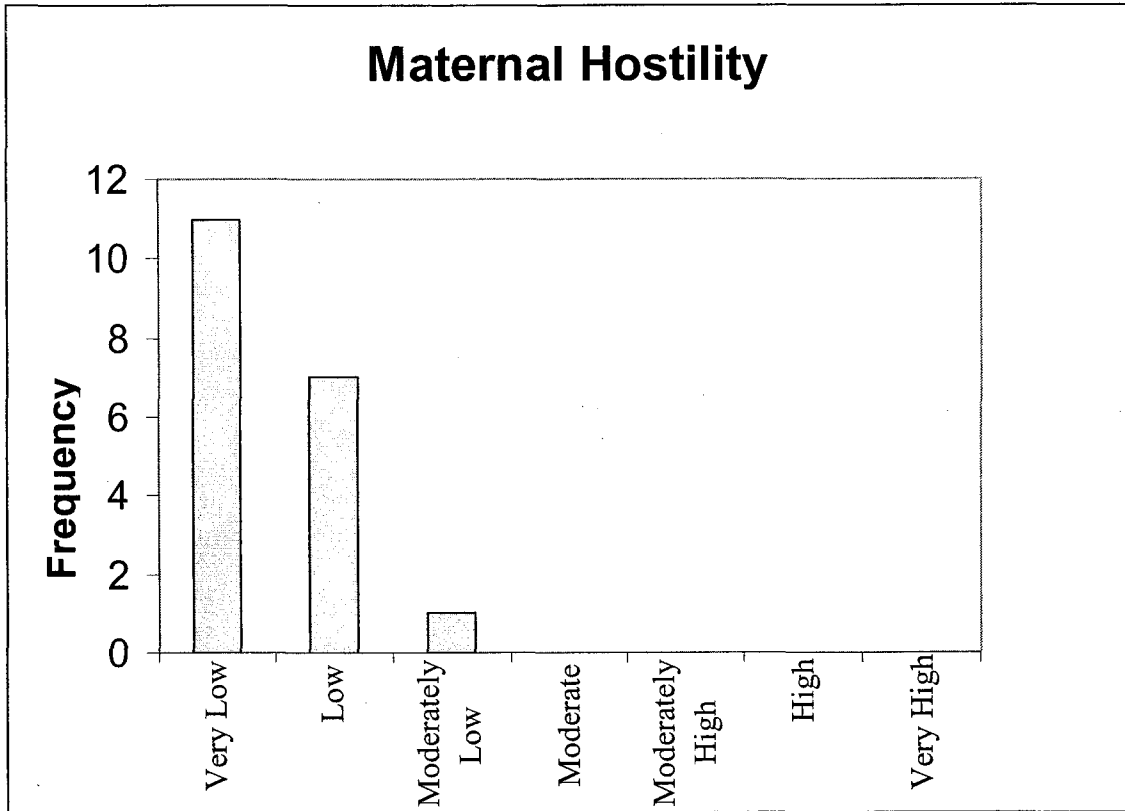


Figure 4. Maternal hostility values observed at Time 1

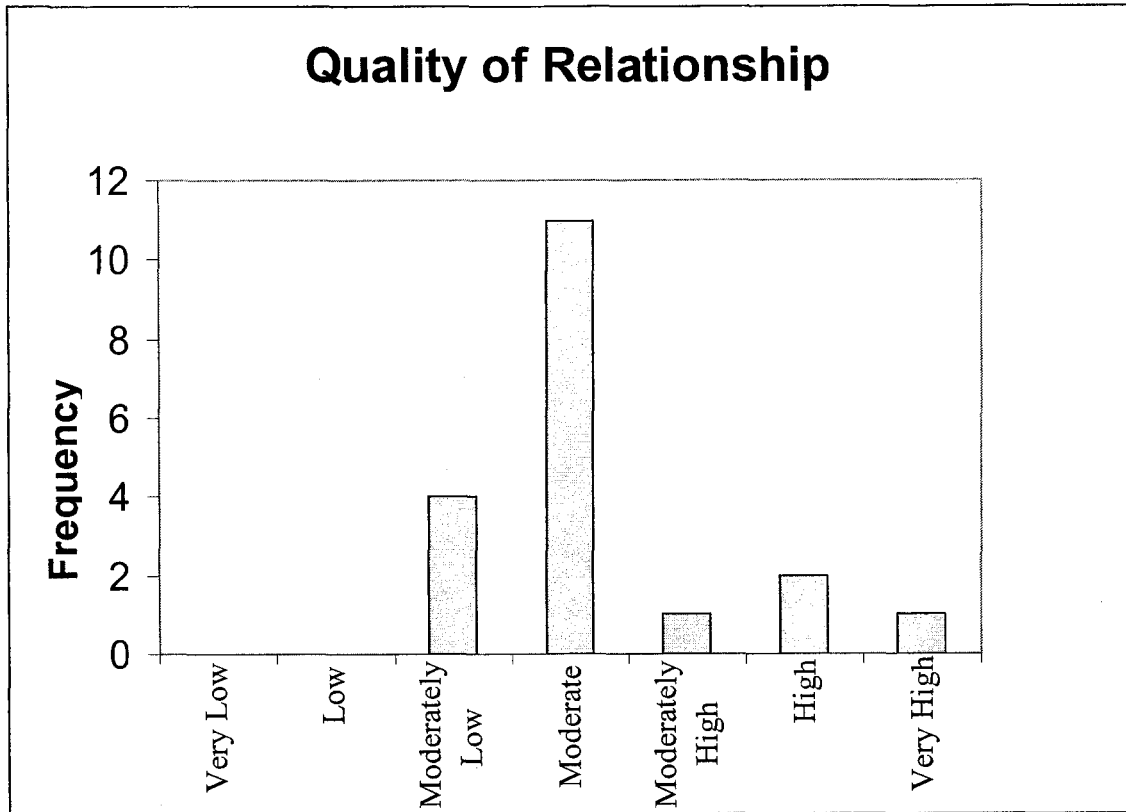


Figure 5. Quality of relationship values observed at Time 1.

a *moderate* quality of relationship, and only 3 dyads showing high or very high relationship quality.

Next, in preliminary analyses prior to testing hypotheses 2a, 2b and 2c, the mother-child interaction variables were related to Time 1 to Time 2 Spanish D change score, using Pearson correlations. Table 12 presents intercorrelations between mother-child interaction variables and Spanish D change scores.

Spanish D change scores were not related to any of the mother-child interaction variables. A multiple regression relating mother-child interaction variables and Spanish D change score was attempted, however the tolerance levels were too low given the very small  $R^2$ ; as a result these analyses are not reported. Note that there are much higher correlations among predictors than there are between each predictor and the Spanish D change score, indicating that multiple regression might be misleading because of possible suppressor effects. Thus, there was no evidence to support the three hypotheses

Table 12.

*Correlations between Spanish D Change Score and Mother-child Interaction*

Measure	1	2	3
Spanish D Chang	.07	.14	-.07
1. Intrusiveness	—	.43	-.18
2. Hostility		—	-.27
3. Quality of Relationship			—

*Note.*  $N = 19$ . Intrusiveness = Maternal Intrusiveness; Hostility = Maternal Hostility.

regarding the ability of mother-child interaction variables to predict language change scores.

*Family/child Language Usage and Exposure*

This section addresses the following question and hypotheses related to family/child language usage and exposure:

Question 3. How does family/child L1 language usage, including language usage among family members and peers, and language exposure (e.g. preschool enrollment and visits to Mexico) change over time in children of Mexican immigrants?

Hypothesis 3a. The percentage of time mother and father use Spanish will be positively associated with Spanish D change scores.

Hypothesis 3b. The percentage of time child uses Spanish will be positively associated with Spanish D change scores.

Hypothesis 3c. The number of older children in the home will be negatively associated with Spanish D change scores.

Hypothesis 3d. The number of younger children in the home will not be associated with Spanish D change scores.

Hypothesis 3e. The child's English language usage (English or English + Spanish) with peers and siblings will be negatively associated with Spanish D change scores.

Hypothesis 3f. Preschool enrollment will not be associated with Spanish D change scores.

Hypothesis 3g. The number of weeks a child spends in Mexico a year will be positively associated with Spanish D change scores.

To address the third question, means and standard deviations for family/child language usage and exposure variables were calculated. Table 5 presents the values obtained. Mean values demonstrated that as a group, both mothers and fathers used Spanish with their children over 97% of the time across all time points. Children appeared to use slightly less Spanish with their parents over time. Likewise, those children who were available at Time 3 appeared to begin to use some English with friends by Time 3. However, paired samples t tests comparing Time 1 to Time 2 values and Time 2 to Time 3 values for these variables were not significant (see Tables 13 and 14). These results suggest that Spanish was spoken almost exclusively in the homes of these children throughout the course of the study; and that as a group, these children presented as emergent sequential bilinguals with mostly low levels of English exposure. At Time 1 ( $N=19$ ) 5 children were enrolled in preschool programs; by Time 2 ( $N=19$ ) 11 children were in preschool programs. This was a significant increase ( $p = .05$ ., see Table 13). Four of the children had been enrolled in preschool programs for two years at Time 2, so in order to capture the effects of two years of enrollment a new variable was calculated, total years of preschool enrollment at Time 2. At Time 2, 7 children (37%) had not been enrolled in preschool programs, 8 (42%) had been enrolled in preschool programs for 1 year, and 4 (21%) had been enrolled in preschool programs for two years. By Time 3 ( $N = 10$ ) 6 children (60%) were enrolled in preschool programs, or in the case of two subjects, kindergarten programs. Less variation was seen in the other language exposure variable of interest, weeks per year spent in Mexico. Only 3 of the families spent time in Mexico, and the same families tended to return regularly over the course of

Table 13

*Differences between Time 1 and Time 2 Family/child language Usage and Exposure*

Variable	Time 1		Time 2		df	t
	M	SD	M	SD		
% Spanish mother	98	4	98	4	18	.00
% Spanish father	97	12	98	5	16	-1.00
% Spanish child	97	13	92	16	18	2.24
Siblings	2.9	.25	2.8	.40	14	1.47
Friends	2.7	.67	2.7	.48	18	.00
Years of preschool	.26	.45	.58	.50	18	-2.36*
Weeks in Mexico	1.5	4.0	1.4	4.0	18	1.00

*Note.* The variables, language that child uses with siblings, and language that child uses with friends; were coded as 3-Spanish, 2 Spanish + English, and 1 English. Friends = child's language usage with friends; Siblings = child's language with siblings.

$p = .05$ .

Table 14

*Differences between Time 2 and Time 3 Child Language Usage*

Variable	Time 2		Time 3		df	t
	M	SD	M	SD		
% Spanish mother	98	4	97	5	9	1.00
% Spanish father	99	3	99	3	9	.00
% Spanish child	92	16	86	16	9	1.41
Siblings	2.8	.46	2.8	.46	9	.00
Friends	2.7	.48	2.4	.84	9	1.15
Years of preschool	.50	.53	.60	.52	9	-.58
Weeks in Mexico	.20	.42	.60	1.3	9	-1.00

*Note.* The variables, language that child uses with siblings, and language that child uses with friends; were coded as 3-Spanish, 2 Spanish + English, and 1 English. Friends = child's language usage with friends; Siblings = child's language with siblings.

$p = .05$ .

the study. Paired samples t tests revealed no differences across time for this variable. Because of this limited variability, this variable was dropped from further analyses.

Preliminary to the regression addressing hypotheses 3a-f regarding the relation between English language exposure variables and Spanish D change scores, Pearson correlations between Time 1 values of mother and father's percentage of Spanish usage, child's percentage of Spanish usage with parents, child's language with siblings and friends, as well as total years of preschool enrollment at Time 2 were calculated. Table 15 presents these correlations.

Percentage of time mothers used Spanish was highly correlated ( $p < .001$ ) with the percentage of time fathers and children used Spanish. Percentage of time father uses Spanish, and the percentage of time child uses Spanish with parents were highly correlated, as was percentage of time child uses Spanish and child's language usage with friends ( $p < .01$ ). Child language usage with siblings and number of older children in the home appeared somewhat correlated ( $r = -.47$ ), however these variables were not normally distributed and the correlation was highly influenced by an outlier. Of all the family/child language usage and exposure variables, only total years of preschool at Time 2 was significantly correlated with Spanish D change scores ( $r = .55, p < .01$ ).

Table 15

*Intercorrelations for Spanish D Change Score and Family/child language Usage and Exposure Variables*

Measure	1	2	3	4	5	6	7	8
Spanish-D	.38	.11	.16	-.12	.18	-.14	-.26	.55**
1. % Sp-mot	—	.67**	.88**	.31*	.16	-.07	.23	-.09
2. % Sp-fat		—	.37	.30	.30	-.07	-.01	-.10
3. % Sp-chi			—	.40	.03	.11	.49*	-.22
4. # older children				—	-.20	-.47	.19	-.27
5. # younger children					—	.24	.18	-.03
6. Sibling language						—	.35	-.07
7. Friend language							—	-.43
8. Years of preschool								—

*Note.* \*\* $p < .01$  \* $p < .05$ . Spanish D = Spanish D change score; % Sp-mot = percentage of time mother uses Spanish with child; % Sp-fat = percentage of time father uses Spanish with child; % Sp-chi = percentage of time child uses Spanish with parents; # older children = number of children in the home; # younger children = number of younger children in the home; Sibling language = language that child uses with siblings; Friend language = language that child uses with friends; Years of preschool = total years of preschool enrollment at Time 2. The variables language that child uses with siblings, and language that child uses with friends; were coded as 3-Spanish, 2 Spanish + English, and 1 English.

Given the low to moderate correlations between the English exposure variables (other than the preschool variable) and Spanish D, along with the restricted variability in some variables and the high correlations among some variables, it was decided to create a single measure of multiple sources of English language exposure, which could then, along with the preschool variable, be used to predict Spanish D change scores. This new variable, amount of English exposure, was created by recoding information from the demographic interview to reflect the number of contexts in which English was used by the child or others. Father's use of English with child, mother's use of English with child, child's use of English with parent, child's use of English with siblings, child's use of English with peers, and parent's use of English during book reading activities with child were first recoded as dichotomous variables: no English (0) or some English (1). Then, the resulting variables were added together to calculate a new variable entitled amount of English exposure. Eight of the subjects continued to have no English exposure or usage patterns, while the other 11 subjects demonstrated some level of English exposure or usage ( $M = 1.26, SD = 1.70$ ). In other words, the children in this study were emergent sequential bilinguals with minimal exposure to English. A zero order correlation between the combined English exposure variable and Spanish D change score was calculated, English exposure was not significantly correlated with Spanish D change score ( $r = -.15, N = 19$ ).

A multiple regression was then calculated to examine the predictive relationship between this combined measure of family/child English language and preschool exposure, and Spanish D growth score. A forced entry model was employed that entered

Table 16

*Regression Analysis Summary for Family/child language and Exposure Variables**Predicting Spanish D Change Score*

Variable	<i>B</i>	<i>SEB</i>	$\beta$
Years of Preschool English Exposure	16.20	5.44	.60*
	-3.33	2.50	-.28

Note.  $R^2 = .29$  ( $N = 1$ ).

\* $p < .01$ .

combined years of preschool enrollment at Time 2 and amount of English exposure simultaneously. Table 16 presents values obtained. Preschool enrollment and English exposure accounted for 29% of the variance in Spanish D change scores. Tolerance levels were acceptable for each of the predictor variables. Years of preschool enrollment was a significant predictor ( $p = < .01$ ) of Spanish D change scores; English exposure did not contribute significantly over and above the effects of preschool, but did operate in the predicted direction.

A final multiple regression was calculated in order to examine the concurrent predictive relationship of the two significant predictors, total years of preschool enrollment and percentage of utterances containing errors, with the outcome variable,

Table 17

*Correlations Between Spanish D Change Score and Years of Preschool and Percentage of Errors*

Measure	1	2
Span D change	.55*	-.65**
1. Yrs. Preschool	—	-.57*
2. % Errors		—

Note. \* $p < .05$ , \*\* $p < .01$ .

Spanish D change score. Table 17 presents intercorrelations between these variables. Years of preschool enrollment and percentage of errors were highly correlated ( $r = -.57, p = .05$ ), in fact, years of preschool enrollment was more highly correlated with percentage of errors than it was with the outcome variable; thus, multicollinearity needed to be monitored.

In a forced entry regression in which years of preschool enrollment and percentage of errors simultaneously predicted Spanish D change scores, however, tolerance levels were well over our criterion of  $1 - R^2$  (.59), so the regression will be reported. Table 18 presents the results obtained from this regression.

Years of preschool enrollment and percentage of errors accounted for 41% of the variability seen in Spanish D change scores. Percentage of errors had significant predictive value; however, once percentage of errors was considered, the preschool experience no longer predicted Spanish D change. Given the strong negative relation

Table 18

*Regression Analysis Summary for Years of Preschool and Percentage of Errors*

*Predicting Spanish D Change Score*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Yrs. Preschool	6.99	5.92	.26
% of Errors	-.76	.33	-.51*

*Note.*  $R^2 = .41$  ( $N = 19$ )

\* $p < .05$ .

between preschool attendance and percentage of errors and the significant positive relation between preschool attendance and Spanish D change when percentage of errors is not included as a predictor, this finding suggests that the reduction in grammatical errors associated with preschool attendance mediates the relation between preschool attendance and improvement in Spanish D from Time 1 to Time 2.

*Descriptive Analysis of Time 1 and Time 2 Error Patterns*

The number of errors committed was negatively associated with maintenance of Spanish lexical diversity. In order to better understand this relationship, exploratory and descriptive analyses were conducted with data from Time 1 and 2. Some researchers have suggested that exploring the type of error committed may be informative and may provide insight into markers of language behaviors that are indicative of language attrition or SLI (Restrepo, 1998; Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000; Novikoff & Anderson, 2005). For these analyses two subgroups were formed, a group that demonstrated 10 point or more decrease in Spanish D between Time 1 and

Time 2, and a comparison group that demonstrated a 10 point or higher increase in Spanish D. Only 3 subjects demonstrated a 10 point decrease. A comparison group was selected by choosing the first 3 files reviewed that demonstrated a 10 point increase and at committed at least one grammatical error.

The children in the decrease group had more errors ( $M = 4.5\%$  of total utterances) than the Spanish D increase group ( $M = 2\%$  of total utterances), despite the requirement for the increase group to have at least one error. Table 19 presents error data by group. Many of the errors for both groups were related to verb usage. Other errors included incorrect gender or plurality in noun, pronoun, and adjectives, as well as the omission of clitics. In Spanish, clitics are unstressed direct and indirect object pronouns that are attached to the preceding verb (e.g. *dámelo* “give it to me”; Bedore, 1999). These non-verb errors were so few in number and diverse in type that no specific patterns across groups were detected. Table 19 presents errors patterns seen in both groups.

Table 19

*Total Error and Verb Error Frequency and Type of Verbal Errors Observed in the Spanish D Decrease and Increase Subgroups*

	Increase Group	Decrease Group
Total # errors	8	18
Total # verb errors	3	10
Type of verb error		
Inflectional	3	4
Non-inflectional	0	3
Semantic	0	3

Verb usage errors were further analyzed to determine if a given error type was more prevalent in the attrition or maintenance group. Verb errors were classified into three categories as described by Novikoff and Anderson (2005), these included: inflectional errors, non-inflectional errors, and semantic errors. Inflectional verb errors include grammatical errors in how a verb is modified to communicate number, person, mood, tense, or aspect. For example if a child said “*ellos está jugando*,” the inflection for number is incorrect because the child used the third person singular, *está*, instead of the third person plural, *están*. Non-inflectional verb errors include errors related to the verb stem; verb endings (–ar –ir or –er); gerund form (–ando and –iendo, which are equivalent to –ing endings in English); and syntactic structure or word order. If a child said “*no sepo*,” this would be a non-inflectional stem error in which the irregular form of a verb (*sé*) was not used. Semantic verb errors included: using the incorrect verb; using an extra verb; omitting the verb from the sentence; or inventing a verb. For example, if a child said “*es lloviendo*,” they would be demonstrating a semantic error in which the incorrect verb was used (*ser* instead of *estar*). The bottom four rows in Table 19 present the results of this verb-error analysis. Children in the maintenance group produced fewer verb usage errors, and produced only inflectional errors; while the attrition group committed inflectional, non-inflectional, and semantic verb usage errors. This analysis provided preliminary evidence that non-inflectional, and semantic verb usage errors may be related to language attrition; however, these analysis need to be repeated with a larger number of subjects before this finding can be substantiated.

### *Spanish Language Trajectories*

The final research question is addressed in this section.

Question 5. What language stability profiles and Spanish language development trajectories are seen in children of Mexican immigrants?

Descriptive analyses were completed with data that were collected across all three time points. Each of the 10 subjects' Spanish D scores were plotted at all three time points; these trajectories as well as the mean trajectory are presented in Figure 6. The mean trajectory is presented with a dotted black line. Five of the trajectories demonstrated a general positive growth trend, which suggests a Spanish language maintenance profile. Three of the trajectories demonstrated a decrease in Spanish D at Time 2 or Time 3; however, at Time 3 these 3 subjects had Spanish D values (61.01, 43.64, 65.47) that were within one standard deviation of the mean Spanish D value at Time 3 ( $M = 55.45$ ,  $SD = 22.59$ ). Two subjects, both girls, presented with trajectories that were different from the others; the pseudonyms Angelica and Blanca were assigned to these children. Angelica's trajectory began above the mean but gradually decreased over time, while Blanca presented with comparable scores across all three time points that were considerably lower than the mean trajectory. Data were collected at two additional time points for Blanca (27 and 33 months of age) that were not used for these plots given the absence of comparable scores for the other participants, however, it is important to note that her Spanish D scores at these points were higher than her scores at the three time points used in this study, suggesting L1 attrition rather than low ability. Both subjects had Spanish D scores at Time 3 that were one standard deviation or more below the mean (Angelica: 24.18, Blanca: 15.49,  $M = 55.45$ ,  $SD = 22.59$ ).

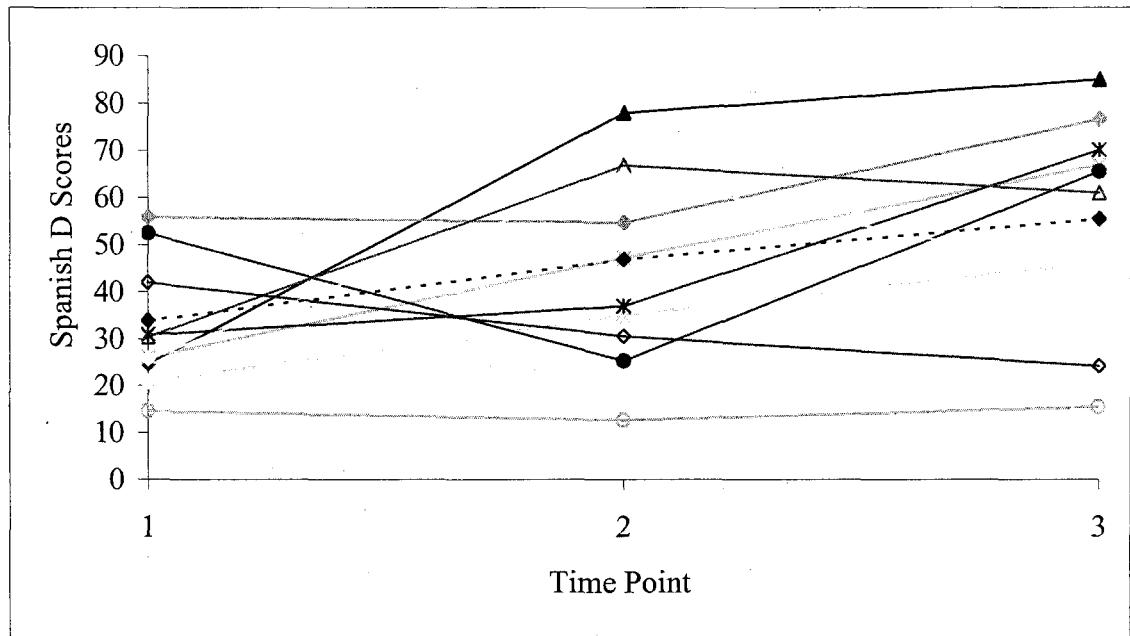


Figure 6. Spanish D trajectories for the 10 subjects seen at all three time points as well as the mean trajectory.

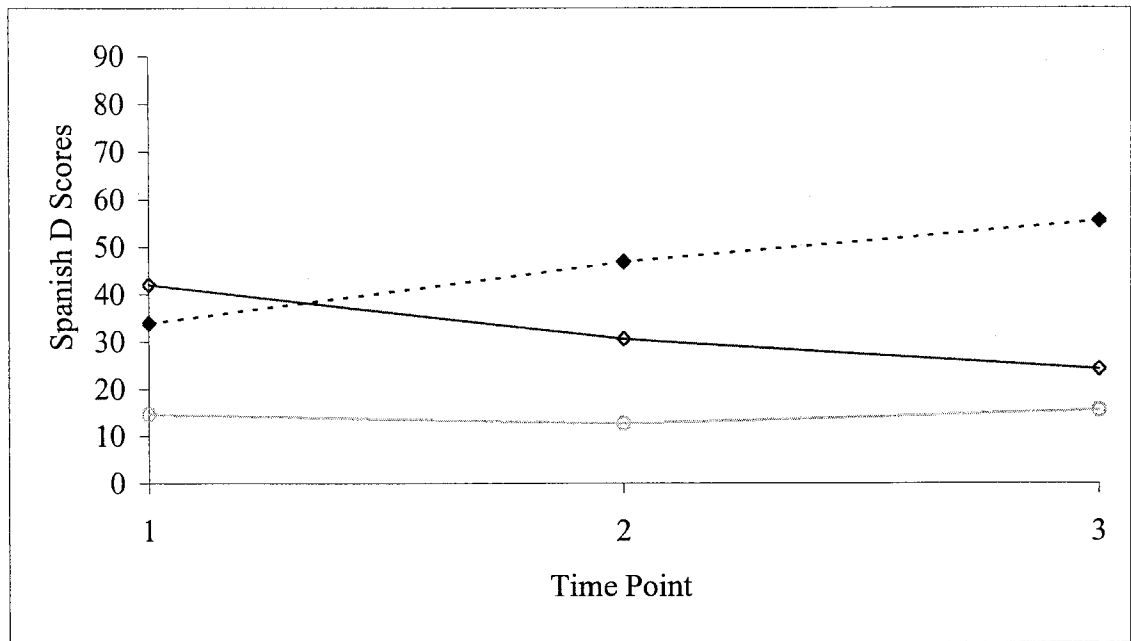


Figure 7. Angelica and Blanca's trajectories and the mean trajectory (dotted line = mean trajectory; middle line with diamonds at time points = Angelica's trajectory; bottom line with circles at time points = Blanca's trajectory).

Figure 7 presents Angelica and Blanca's trajectories and the mean trajectory. Angelica and Blanca's trajectories appeared to demonstrate language attrition profiles. Therefore, two groups were formed based on trajectory types observed. Angelica and Blanca, demonstrated Spanish D attrition and had noticeably lower scores at Time 3 when compared to the mean trajectory and Time 3 Spanish D score. Thus, these two children were placed in the language attrition group. The rest of the children were placed in the language maintenance group. Table 20 presents the maintenance group's mean Spanish D and SLAP scores, as well as Angelica and Blanca's scores.

Table 20

*Maintenance Group Mean and Standard Deviations for Language Variables at Time 3, and Child A and B's values.*

Variable	<u>Maintenance Group</u>		<u>Attrition Group</u>	
	<i>M</i>	<i>SD</i>	Angelica	Blanca
Spanish D.	64.35	14.05	24.18	15.49
SLAP Vocab.	60	5	52	1
SLAP Language	28	9	2	0

Angelica presented with lower Spanish D scores; yet, her expressive vocabulary score on the SLAP was almost in the same range as the maintenance group's. However, her scores on the language subtests of the SLAP were lower than those of the maintenance group's. Blanca presented with lower Spanish D scores on both the SLAP vocabulary and language subtests. However, it should be noted that Blanca provided many answers on the SLAP in English. Since the goal of the current study was to measure Spanish language development and L1 maintenance profiles, Blanca was not given credit for these responses. If English responses were counted, Blanca's vocabulary and language scores would be comparable to the maintenance group's scores. All of the children were prompted to use Spanish when given the SLAP. Blanca either chose to use English or was not able to complete these tasks in Spanish. In any case, Blanca appeared to have lost either the motivation or the skill to communicate in Spanish.

Observed child language behaviors at Time 3 were then calculated for descriptive comparison purposes. Table 21 presents the maintenance group's as well as Angelica and Blanca's percentage of utterances code-mixed, percentage of utterances with errors, and number of general term/non-descriptive words. Angelica code-mixed at about the same rate as the maintenance group, but she had somewhat higher use of general term/non-descriptive words. Blanca code-mixed more, but more importantly had substantially more errors than most children.

Table 21

*Maintenance Group Mean and Standard Deviations and Angelica and Blanca's Observed Child Language Behaviors at Time 3*

Variable	<u>Maintenance Group</u>		<u>Attrition Group</u>	
	<i>M</i>	<i>SD</i>	Angelica	Blanca
% Code-mixed	1	1	1	8
% Errors	2	2	4	18
# General Term	17	12	25	8

Exploratory description of mother-child interaction variables for these two girls who showed language attrition was completed. Both girls had identical scores on all three variables, which were not different from the average scores seen in the larger sample. Both dyads demonstrated low levels of maternal intrusiveness and maternal hostility, and moderate levels of quality of relationship.

Family/child language usage and exposure variables were calculated for the maintenance group and for the two children who demonstrated language attrition. These results are presented in Table 22. Angelica's language usage with parents was much like that of the maintenance group; however, she used both Spanish and English with siblings and friends. She had not been enrolled in preschool, but her parents reported that her brother spoke mostly English with Angelica and that she received daycare in the home 40 hours a week with an aunt who spoke both Spanish and English. They also reported that

Table 22

*Maintenance Group Mean and Standard Deviations and Child A and B's Family/child language Usage and Exposure Variables at Time 3*

Variable	Maintenance Group		Attrition Group	
	<i>M</i>	<i>SD</i>	Angelica	Blanca
% Spanish mother	98	5	100	90
% Spanish father	99	1	100	90
% Spanish child	90	12	90	50
# older children	1.25	1.28	1	0
# younger children	1.13	.64	0	1
Sibling language	2.8	.35	2	1
Friend language	2.5	.75	2	1
Preschool enrollment	1.5	1.2	0	3
Weeks in Mexico	.75	2.1	4	3

*Note.* # older children = number of children in the home; # younger children = number of younger children in the home; Sibling language = language that child uses with siblings; Friend language = language that child uses with friends. The variables language that child uses with siblings, and language that child uses with friends; were coded as 3-Spanish, 2 Spanish + English, and 1 English.

Angelica was exposed to English through television and that she used English when she played.

Blanca used English 50% of time when speaking with her parents, which is noticeably more than the maintenance group. Blanca also used English only when speaking with siblings and friends. She had been enrolled in preschool for three years, her parents also reported that they used English when reading with Blanca and that Blanca used English when she played.

Analyses that involved plotting Spanish D trajectories revealed that Angelica and Blanca presented with language attrition profiles. In addition, both girls had an observed language behavior that was different from the maintenance group's language behaviors. Mother-child interaction patterns for these two girls were quite comparable to that of the larger sample of 19 children. Both girls also had consistent English language exposure, one through contexts in the home and the other through three years of preschool programming.

#### Summary of Results

This study described the Spanish lexical development; observed child language behaviors; mother-child interaction; and family/child language usage patterns of 19 preschool aged children of Mexican-immigrants and examined the predictive relation between observed child language behaviors, mother-child interaction, and English language exposure, on the one hand, and change in Spanish lexical diversity, as measure by D. It also described the language trajectories of 10 children across three years. Results are summarized as follows: Quantitative analyses revealed that observed child language

behaviors of code-mixing; use of general term/non-descriptive words; and percentage of errors did not change significantly over time. Additional descriptive analyses revealed that the mother-child interaction observed at Time 1 were characterized as having varied levels of intrusiveness, low levels of hostility, and moderate levels of quality of relationship. Family/child language usage in this study did not change much over time; however, the children appeared to use slightly less Spanish with their parents over time and appeared to begin to use some English with friends by Time 3. As a group, the children could be described as emergent sequential bilinguals who are beginning to be exposed to English.

Quantitative analyses demonstrated that percentage of errors and years of preschool enrollment both were significantly related to Spanish lexical growth; however, when percentage of errors was controlled for, years of preschool enrollment was not predictive of Spanish lexical growth. Additional descriptive analysis revealed that children with language attrition patterns had more verb usage errors and committed non-inflection and semantic based verb errors, while children in the maintenance group did not commit these types of errors. Also, exploratory analysis with 9 subjects demonstrated that code-mixing was not associated with Spanish lexical development. The mother-child interaction variables in this study were not related to L1 attrition.

Of the 13 hypotheses stated, the following 4 were substantiated by statistical results:

1. The percentage of code-mixed utterances was not associated with Spanish D change scores over and above the contribution of other predictors.

2. The percentage of utterances containing errors was negatively associated with Spanish D change scores.
3. The number of younger children in the home was not associated with Spanish D change scores.

A number of additional findings were revealed through these analyses.

1. Spanish general term/non-descriptive words were not associated with Spanish D change scores.
2. Mother-child interaction styles were not associated with Spanish D change scores.
3. Family/child language behaviors, and the child's language usage with peers were not associated with Spanish D change scores.
4. Total years of preschool enrollment was positively associated with Spanish D change scores.
5. The number of weeks a child spends in Mexico a year was not associated with positively with Spanish D change scores.

Descriptive analyses that included all three time points, revealed that children who demonstrated Spanish lexical growth or maintenance trajectories tended to score higher on the SLAP language subtests. Two subjects demonstrated language attrition profiles across the three time points. Blanca made more grammatical errors and used more English with her parents, siblings, and friends than the maintenance group.

Angelica used more general term/non-descriptive words, and was exposed to and used English in a variety of contexts in the home.

## Chapter V

### Discussion

#### *Observed Child Language Behavior*

Two of the observed child language behaviors studied were not predictive of Spanish language maintenance. Exploratory analyses including the 9 children who code-mixed demonstrated that code-mixing was not associated with L1 maintenance or loss. This finding supports a larger body of research that has documented code-mixing as a typical bilingual behavior, and not a sign of language confusion or deficit. The analysis that involved all 19 subjects demonstrated that the use of general term/non-descriptive words was not related to Spanish language attrition. This finding was somewhat surprising given reports from earlier case studies (Anderson, 1999a; Anderson, 1999b); at the same time, it may be the case that children do not begin to overemploy general term/non-descriptive words until they are older or have been exposed to English for a number of years (R.T. Anderson, personal communication, November 19, 2005). Anderson (1999a) observed that the child in her study began to over-employ general term/non-descriptive words toward the end of the two year study, near age six and after having been exposed to multiple years of English instruction.

In the present study's primary analysis, which included data on 19 children between Times 1 and 2, over usage of general term/non-descriptive did not occur. This may have been because, at these points, the children didn't have successive years of

exposure to English. However, in the exploratory description of the two children who showed language attrition across the three time points in this study, one of the children experiencing language attrition used significantly more general term/non-descriptive words than the maintenance group. In addition to this possibility that general term/non-descriptive words only become indicative of L1 attrition at older ages, it is possible that the child observed in the case studies or the children in our own small sample were not representative of the population. In order to better understand the relationships between general term/non-descriptive words and L1 attrition, in future studies it would be beneficial to follow a larger sample of children in both bilingual and English language educational settings for a number of years.

Percentage of errors was predictive of Spanish language attrition. The findings from this study support other research (Anderson, 1999a; Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000) that has described the relationship between grammatical errors and L1 attrition. Descriptive analysis that included Time 1 and 2 suggested that verb usage errors were more common in the children with L1 attrition profiles, with preliminary evidence suggesting that non-inflectional and semantic verb usage error are more common in children experiencing L1 attrition. Interestingly, studies of children with SLI suggest that they also present with difficulties associated with the morphological components of verb usage (Gavin, Klee, & Membrino, 1993), including difficulties with ditransitive verbs (e.g. give) that require an object, indirect object, and subject (Grela & Leonard, 2003). There is some evidence to suggest that Spanish speaking children with SLI tend to have article usage errors in noun phrases, while English speaking children with SLI have difficulties with verb usage (Restrepo, 1998);

however, there is also emerging evidence that Spanish speaking children with SLI make a variety of verb usage errors (e.g. inflectional, non-inflectional, and semantic; Novikoff & Anderson, 2005; Restrepo & Gutiérrez-Clellen, 2004). According to the present study, as typically developing Spanish speaking children experiencing L1 attrition are exposed to English over time they also seem to commit a variety of grammatical errors, including non-inflectional and semantic verb usage errors. It would appear then that as typically developing Spanish children experience L1 attrition and are exposed to more English, they begin to commit a wider variety of errors than language-maintaining children, errors that could easily be mistaken for characteristics of SLI.

#### *Mother-Child Interaction*

Maternal intrusiveness, maternal hostility, and quality of relationship were not related to Spanish D change scores in the current study. Findings from previous studies would suggest that these mother-child interaction variables would be related to language stability profiles (Tannenbaum, 2003; Luo & Wiseman, 2000; Tannenbaum & Howie, 2002; Sridhar, 1988); however, the participants in the studies reviewed were Chinese immigrants. It may be that the relationship between parent-child interaction and language attrition is not the same across differing immigrant populations. Yet, family cohesion and language attrition have been speculated to be related by researchers studying Mexican-immigrants (Hill, Bush, & Roosa, 2003), thus it would seem that mother-child interaction would be related to Spanish language maintenance.

There are a number of considerations to take into account when interpreting the mother child-interaction findings for the current study, however. Most important is the extremely limited variability in two key mother-child interaction variables: hostility and

overall quality of relationship. The only variable for which reasonable variability was observed, intrusiveness, is the least obvious in terms of its bearing on the parent-child relationship. Although it seems clear from the literature that parental hostility undermines parent-child relationships (for a review, see Coplan, Bowker, & Cooper, 2003; DeWolff & van Ijzendoorn, 1997) and that low quality of relationship directly indicates poor relationship quality, it seems possible for differences in intrusiveness to exist without concomitant impairment of the relationship. One would expect children who have poor relationships with their mothers to be more likely to reject the use of the mother's language, but it is less clear that one would be less inclined to adopt the language of a highly involved (intrusive) mother.

The small sample size used in this study may have impacted these findings; perhaps there would be a greater range of variability for the mother-child variables in a larger sample. Also, the distribution for these variables may have been truncated because only 10 minutes were available for coding mother-child interaction. If there had been 20 minutes or 25 minutes available, perhaps different results would have been obtained. The high correlation between results obtained from 10 minutes and those obtained for 25 minutes in the subsample suggests otherwise; however, it is unclear how representative this subsample is of the larger sample and population. The current study employed a secondary data set in which mother-child interactions were allowed to unfold in a highly naturalistic manner; in future studies it would be beneficial to control the video taped interactions so that less interruptions occur and longer mother-child interactions are afforded. Perhaps a laboratory or classroom setting would lend itself to collecting more controlled video-samples of mother-child interactions.

### *Family/Child Language Usage and Exposure*

The 19 families studied did not demonstrate language shift from Spanish to English within the family; family members continued to speak Spanish with one another over time. Even the English exposure variable in the present study, which quantified the amount of English to which the children were exposed in a variety of contexts, demonstrated very limited variability and did not contribute significantly to predicting Spanish D change scores. However, it did operate in the predicted direction. The limited variability in exposure of this sample to English places a constraint on the ability of the variable to be associated with Spanish D change, as well as on the interpretation of findings regarding the effects of English exposure on language attrition. Some of the children in this study may not, in fact, have been bilingual as yet, but rather monolingual Spanish or emergent sequential bilinguals. Over time, some children in this study began to speak more English with parents and peers; however, this increase in English usage was not significant for the group as a whole.

Existing research suggests that the younger the age at which children are enrolled in educational settings that use English, the more likely they are to switch towards using English (Hakuta & D'Andrea, 1992). Thus, it is likely that unless these children are afforded bilingual education, they will gradually begin to use more English and less Spanish as they progress through school.

Years of preschool enrollment was significantly related to Spanish D change scores; however, children with more preschool experience demonstrated *more* Spanish language growth. While it is not clear what percentage of English was used in these classrooms, it is known that all children enrolled in preschool programs were exposed to

English to some extent. Wong Fillmore's (1991) study suggested that any level of English exposure would likely result in significantly increased English usage in the home (and, presumably, consequent L1 attrition). The findings from the current study provide evidence to the contrary; child language usage was not related to preschool enrollment status; in fact, more years of enrollment resulted in more L1 development. The analysis in which both preschool exposure and percentage of errors were included as predictors provides a possible explanation for this finding. Perhaps consistent exposure to rich vocabulary and academic language from preschool teachers, and the increased demand for language performance that children experience in preschool environments, enable children to make greater gains in language development, including making fewer grammatical errors.

Another possibility is that the preschools in which these children were enrolled were accepting of Spanish even though they provided at least some instruction in English. Perhaps more important than English usage in preschool programming, are the teacher's beliefs and attitudes about parental usage of L1. The parents in the current study continued to use almost exclusively Spanish with their children; however, information was not available to quantify language usage in the classroom or teacher's attitudes towards parental L1 usage. There is some evidence that suggests that when teachers support additive bilingualism and encourage parents to continue to use L1, children experience cognitive, emotional, and cultural benefits (Tabors, 1997). Future studies should include direct classroom observations to determine the percentage of English and Spanish used, as well as measurements that quantify the teacher's beliefs about L1 usage and practices that encourage or discourage parental L1 usage.

### *Trajectories*

Descriptive analyses that involved plotting and examining 10 trajectories across three time points provided interesting preliminary findings. Two subjects, Blanca and Angelica, presented with trajectories that differed substantially from the mean trajectory. Both girls presented with attrition profiles, but they also had individual differences, much like the children in Anderson's studies (1999a, 1999b).

Angelica had Spanish D scores that decreased consistently over the three time points. At the third time point she also used more general term/non-descriptive words than most children in the study. Her vocabulary as measured by the SLAP was comparable to that of other children's; however, she did not perform well on the language items. According to the language usage survey her parents completed, Angelica used primarily Spanish with her parents, however she used both English and Spanish with siblings and peers. Angelica was not exposed to English through preschool programs; however, there were indicators that Angelica had multiple sources of English exposure in the home (e.g. aunt, older brother, reading activities, during play, television). This English usage and exposure likely impacted Angelica's language trajectory and her performance on the language subtests of the SLAP.

Blanca presented with a language attrition profile that differed from Angelica's. At two earlier time points (27 and 33 months of age) Blanca demonstrated Spanish D scores that were higher than her scores at Time 1, 2, and 3. Her scores at these later three time points were significantly lower than the other children. Blanca spoke a mix of Spanish and English, but she spoke more English earlier than any of the other children in the study and her Spanish also had more errors than any other child in the study. She

spoke English with her brother and peers, and she spoke English 50% of the time with her parents, even though her parents reported that they spoke Spanish 90% of the time. Blanca was enrolled in preschool for three years, and used English during play. Most striking was the fact that she was unwilling or unable to complete the SLAP testing in Spanish, even when provided prompts to use Spanish. It appears that Blanca chose English as her preferred language, or lost the ability to use Spanish in certain contexts. Her L1 attrition could be related to her earlier involvement in preschool, with three years of exposure; yet a number of other children also had three years of preschool but did not demonstrate L1 attrition or such a dramatic shift towards English usage.

Based on the analyses of these trajectories, it appears that L1 attrition can occur under various language usage and exposure conditions, and that a number of differing language behaviors may be observed. These profiles also demonstrate the variability seen in bilingual children; under similar circumstances children present with differing language stability profiles.

#### Limitations

The current study contains a number of limitations. The data that were used in this study were previously collected at the University of Colorado for other purposes. Additional measures, surveys, or information that would have been useful in addressing the research questions in the current study were not obtained. For example, there is no formal measurement of child English language abilities; this may have been of interest when considering development in children who are beginning to be exposed to English. While much information was obtained through the parent survey, there was relatively little information about the mode of instruction that was used with children who were

enrolled in preschool programs. Parents did indicate the language of instruction; however, some evidence suggests that parents frequently are unclear on the proportion or specific type of language instruction (Wong Fillmore, 1991). Teacher surveys describing language instruction models as well as teacher's attitudes about parental L1 usage would have been useful.

Another limitation is that this study included only 19 children at Times 1 and 2 and 10 children at Time 3, a relatively small number resulting in limited power for analyses and the likelihood that the sample will be less representative of the population. Limited variability was observed in several variables of interest (e.g. maternal hostility, quality of relationship, and percentage of code-mixed utterances), this lack of variability might have been an artifact of having such a small sample. The current study was further limited by the small number of children with L1 attrition profile. A longitudinal study with more participants would be beneficial.

The researcher's perspectives and biases are another source of limitations. The author of this paper holds a number of beliefs that may influence how findings are interpreted. These beliefs and potential pitfalls will be described briefly here. For example, the belief that language development is highly influenced and shaped through social interactions (Tomasello, 1992, 1999) had the potential to influence how the researcher interpreted mother-child interaction style. A social interactionist may be more inclined to believe that a child's language stability profile is determined by the language the parent chooses to use with the child. Likewise, a social-interactionist may be more inclined to believe that maternal hostility would result in a child choosing not to use the home language, or that children with highly synchronized interactions and

responsive mother-child interactions would be more likely to maintain their L1 in order to sustain a relationship and closeness with their mothers. The limited variability seen in these mother-child variables and the lack of any significant findings, suggest that this risk was minimal.

Beliefs about native language usage could also provide for biases. For example, if one believes that parents provide the best language model in their L1, one may view parents who use their L2 as providing less optimal interaction to their child (Tabors, 1997; Li, 1999; Kayser, 1995). This had the potential to influence how data around parent-child interaction or family/child language usage were interpreted, however, the parents in the current study used mostly Spanish and thus this risk was minimal. Even with these potential biases and assumptions that the researcher's perspective could have provided, every attempt was made to code and interpret these data objectively.

## Conclusions and Implications

### *Implications for Educators and Interventionists*

The results from this study and previous studies provide a number of implications for interventionists working with young Spanish speaking children. Interventionists should know which child language behaviors are associated with language attrition and which are associated with typical Spanish language or emergent sequential bilingual development. Numerous studies have demonstrated that code-mixing is a typical bilingual behavior that is not related to language deficits. For the 9 children who code-mixed in the current study, no relationship between code-mixing and L1 maintenance or attrition was detected. Conversely, grammatical errors, were predictive of Spanish language maintenance; previous studies have also determined that grammatical errors are

more common in children with SLI. Additional considerations for differentiating SLI from L1 attrition are provided in the research implications section of this paper. When preschool teachers and other interventionist see emergent bilinguals exhibit high levels of grammatical errors, they should consult with a speech-language pathologist who is familiar with language development in young bilingual children.

Interventionists should also know that exposure to English through preschool programming is not related to L1 attrition. Previous studies demonstrated that bilingual classrooms that provided half of the instruction in Spanish and half in English resulted in language growth in *both* languages. Exact information about language of instruction was not available for the present study; nevertheless, exposure to English (English only or English + Spanish) through preschool programming did not result in L1 attrition. In fact, preschool enrollment was related to *increased* Spanish language development. This finding suggests that providing language minority children with preschool experiences supports language development, even when this involves some level of exposure to English. Perhaps, even more important than preschool language programming, is the teacher's acceptance of the child's L1 as well as his/her practices in encouraging the family to maintain and continue to use the L1 at home and during activities with the child. If interventionists believe in additive bilingualism and encourage parents to maintain their L1, they will see benefits in the child's L2 language development, as well as the child's emotional, social, and cognitive development (for a review, see Tabors, 1997).

### *Research Implications*

As mentioned in the previous section, preschool enrollment did not predict L1 attrition in this study; in fact, children in preschool tended to demonstrate L1 growth. The possibility that these findings reflected greater exposure to increased lexical diversity and grammatical accuracy through the language models in the preschool classroom, as well as the increased language demands that children experience in these environments, suggests that this and other aspects of the preschool environment should be studied more fully in future studies of language attrition. Moreover, some children may respond differently to exposure to instructional English environments, and teacher's beliefs about L1 usage may impact a parent's choice to use English or Spanish with their child during book reading or other academic-language activities. Future studies should include measurements of classroom language practices as well as parental and teacher beliefs about bilingualism and language development.

Similarly, a child exposed to multiple sources of English in the home may begin to shift towards English usage and demonstrate L1 attrition without ever being enrolled in preschool. One of the children in the current study who experienced language attrition also demonstrated higher usage of general term/non-descriptive words. There is emerging evidence that suggests that as children have multiple years of exposure to English they may begin to overuse general term/non-descriptive words, but this possibility requires further study.

Grammatical errors are common in both children with SLI and children experiencing L1 attrition, so in order to differentiate these populations, a thorough language history is needed. In addition, it is important to acknowledge the tremendous

amount of variability in how a child responds to their language environments. For example, in the current study children enrolled in preschool were exposed to some level of English; despite this most children continued to demonstrate Spanish language growth. Conversely, one child began using mostly English shortly after beginning preschool and eventually chose to use English, or was not able to use Spanish, during structured language tasks. Because of this variability at the individual level, a number of areas need to be explored when evaluating and researching bilingual children.

The finding that grammatical difficulties are related to both L1 attrition as well as SLI is of great significance. It reveals the importance of informing speech-language pathologists and other interventionists who work with children from Spanish speaking backgrounds of these patterns so that children are not misdiagnosed with SLI. These findings also emphasize the importance of considering multiple sources of converging evidence to differentiate between L1 attrition and language disorders. These sources should include obtaining the child's bilingual language history; completing thorough parent and teacher interviews; comparing the child's performance to that of other children with similar language and educational backgrounds; and describing changes in the child's L1 and L2 competence over time (Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson; Restrepo; Anderson, 2000). It is also apparent that the use of dynamic assessment practices that elicit various grammatical forms, verbal short term-memory skills, and structured language samples will assist in differentiating SLI from L1 attrition (for a review, see Gutiérrez-Clellen & Restrepo, 2004; Gutiérrez-Clellen & Peña 2001).

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