Published in final edited form as:
Linguist Approaches Biling. 2014 January 1; 4(1): 34–60. doi:10.1075/lab.4.1.02fab.

Dialect Density in Bilingual Puerto Rican Spanish-English Speaking Children

Leah Fabiano-Smith,
The University of Arizona

Rebecca Shuriff,
Ithaca College

Jessica A. Barlow, and
San Diego State University

Brian A. Goldstein
LaSalle University

Abstract

It is still largely unknown how the two phonological systems of bilingual children interact. In this exploratory study, we examine children's use of dialect features to determine how their speech sound systems interact. Six monolingual Puerto Rican Spanish-speaking children and 6 bilingual Puerto Rican Spanish-English speaking children, ages 5-7 years, were included in the current study. Children's single word productions were analyzed for (1) dialect density and (2) frequency of occurrence of dialect features (after Oetting & McDonald, 2002). Nonparametric statistical analyses were used to examine differences within and across language groups. Results indicated that monolinguals and bilinguals exhibited similar dialect density, but differed on the types of dialect features used. Findings are discussed within the theoretical framework of the *Dual Systems Model* (Paradis, 2001) of language acquisition in bilingual children.

Keywords

bilingual; phonology; Spanish; acquisition; Puerto Rican

1. Introduction

Identifying how the two phonological systems of bilingual children interact informs theories of bilingual language acquisition and helps to characterize typical phonological acquisition in bilingual children. Puerto Rican Spanish provides a unique opportunity to examine between-language interaction because it contrasts significantly with English. Puerto Rican

Leah Fabiano-Smith, PhD, CCC-SLP, The University of Arizona, Speech, Language, and Hearing Sciences, 1131 E. 2nd St., Tucson, AZ 85721, Office phone: (520) 626-9740, Fax: (520) 621-9901, leahfabianosmith@email.arizona.edu; Rebecca Shuriff, M.S., Ithaca College, Department of Speech-Language Pathology and Audiology, 953 Danby Rd., Ithaca, NY 14850, rshuriff@gmail.com; Jessica A. Barlow, PhD, San Diego State University, 5500 Campanile Drive, San Diego, CA 92182-1518, Office Phone: (619) 594-0243, Fax: (619) 594-4750, jbarlow@mail.adsu.edu; Brian A. Goldstein, PhD, CCC-SLP, LaSalle University, School of Nursing and Health Sciences, 1900 W. Olney Avenue, St. Benilde Tower 4400, Philadelphia, PA 19141, Office Phone: (215) 951-1431, Goldstein@lasalle.edu.

Spanish is a radical dialect of Spanish which modifies final consonants (e.g., deletion of final /s/) and multiple vibrant sounds, such as the Spanish trill (Guitart, 1997). Unlike conservative dialects, radical dialects tend to weaken and reduce codas and do not increase articulatory complexity in prevocalic consonants (Chela-Flores, 2000; Zamora & Guitart, 1998). In this exploratory study, we address the possibility that both simultaneous bilingual (i.e., children acquiring two languages from birth) and sequential bilingual (i.e., children who acquired Spanish only in the home until entering preschool, where English was introduced) Puerto-Rican Spanish-English-speaking children exhibit decreased use of dialect features in Spanish due to the influence from English, which encourages, for example, the use of /s/ in coda position. Detailing how between-language interaction affects children's use of Puerto Rican dialect features will provide insight into how bilingual children acquire their phonological systems.

1.1 Bilingual Phonological Acquisition

The way in which phonological skills develop in bilingual children is an area of great interest to researchers. Some argue that bilingual children begin with one unitary phonological system for both languages (e.g., Schnitzer & Krasinski 1994), termed the *Unitary System Model*. Others argue that bilingual children separate their phonological systems from very early on in development (e.g., Meisel, 1989; Paradis & Genesee, 1996; De Houwer, 1995), referred to as the *Dual Systems Model*. It has also been argued that bilingual children begin with no system at all, but rather develop templates that serve as the foundation for later production patterns (Vihman, 2002). The majority of past studies that have examined bilingual language acquisition have been case studies of bilingual children; thus, generalizability of their findings has been limited. More recently, the use of group studies has been employed to answer questions related to phonological organization in bilingual acquisition. Results from such studies have indicated that bilingual children maintain separation for the majority of their phonological structures, but that their two language systems are not completely autonomous (Fabiano-Smith & Goldstein, 2010b; Fabiano-Smith & Barlow, 2010; Lleó, 2006; Lleó, Kuchenbrandt, Kehoe, & Trujillo, 2003; Paradis, 2001). More specifically, group studies that have looked across children have found that systematic, between-language interaction occurs in bilingual phonological acquisition. According to Lleó and Kehoe (2002), “More important than establishing an emerging influence is to predict under what conditions influence will emerge” (p. 235). Through examining the use of dialect features by bilingual Puerto Rican Spanish-English bilinguals, we attempt to identify where interaction between a bilingual child's two phonologies will emerge. The acquisition and use of dialect features in bilingual children, as compared to their monolingual peers, could be affected by between-language interaction. More specifically, the influence of English on Spanish could restrict the use of Puerto Rican Spanish dialect features. Work by Paradis and Genesee (1996) describes in detail how such a restriction might occur.

Paradis and Genesee (1996) posed a series of hypotheses to characterize how the two language systems of bilingual children interact: (1) *transfer*; (2) *deceleration*[1], and (3) *acceleration. Transfer* is said to take place in bilingual acquisition when structures specific to one language (i.e., the English approximant /ɹ/) are produced in the other language

context (e.g., the Spanish word *carro* /karo/ ("car") produced as [kaɹo]) (Fabiano-Smith & Goldstein, 2010b; Fabiano-Smith & Barlow, 2009; Law & So, 2006; Fabiano & Goldstein, 2005; Keshavarz & Ingram, 2002; Paradis, 2001). In the current study, we will observe whether bilingual children use English sounds as substitutes in their Spanish productions and vice versa. *Deceleration* is observed when bilingual children acquire certain linguistic structures at a slower rate than their monolingual peers (Fabiano-Smith & Goldstein, 2010b; Lleó, 2006; Paradis & Genesee, 1996). For example, Fabiano-Smith and Goldstein (2010b) found that bilingual Spanish-English speaking 3-year-olds demonstrated lower consonant accuracy in some manner classes when compared to monolinguals of the same age. In the current study, we hypothesize that features of Puerto Rican Spanish could be acquired at a slower rate, or not at all, due to the interaction of Spanish and English. *Acceleration* occurs when bilingual children acquire linguistic structure at a faster rate than their monolingual peers (Gawlitzek-Maiwald & Tracy, 1996; Gretch & Dodd, 2008; Lleó, Kuchenbrandt, Kehoe, & Trujillo, 2003). Fabiano-Smith and Goldstein (2010b) suggested a *variation* of the acceleration hypothesis in which bilingual children utilize between-language interaction to exhibit a similar rate of acquisition as compared to their monolingual peers. The authors found that deceleration and acceleration can occur simultaneously during bilingual phonological acquisition, causing bilingual children to exhibit a *similar* overall rate of acquisition as compared to their monolingual, age-matched peers. Fabiano-Smith and Barlow (2010) examined the phonetic inventories of the same children examined in Fabiano-Smith and Goldstein (2010a; 2010b) and found that the inventories of the bilingual children were just as complex as their age-matched monolingual peers, in both languages. Lleó, Kuchenbrandt, Kehoe, and Trujillo (2003) found that bilingual German-Spanish speaking preschoolers acquired final consonants in Spanish at a faster rate than monolingual Spanish speakers due to the presence of German (to be discussed). It is also hypothesized in the current study that bilinguals and monolinguals could demonstrate similarities in the type and frequency of dialect features used, providing evidence for between-language interaction having little to no effect on acquisition and use of dialect features. Because the current study aimed to look across children for evidence of between-language interaction, and Puerto Rican Spanish is characterized by modifications to syllabic structure (to be discussed), group studies that have focused on between-language interaction in prosodic development in bilingual children are most relevant to the current investigation.

Paradis (2001) was the first to pose a variation of the *Dual Systems Model*, bringing to light that the separate language systems of bilingual children interact at a very low level. That is, although the two languages of bilinguals are, by and large, separate, evidence of the influence of one language on the other can be observed in subtle ways. She examined the prosodic characteristics of 17 bilingual French-English-speaking children, ages 23-35 months. Prosodic constraints conflict between French and English in that French utilizes an iambic stress pattern while English employs a trochaic pattern. Therefore, this prosodic contrast between languages provides an opportunity for between-language interaction to be observed. The results of Paradis' study indicated that the French iambic stress pattern was

[1]Paradis and Genesee (1996) originally used the term *Delay* instead of *Deceleration*. Fabiano-Smith and Goldstein (2010a; 2010b) changed this term to *Deceleration* in order to prevent the interpretation that bilingual children have a clinically diagnosed language delay if aspects of language are acquired at a slower rate than what is expected in monolingual acquisition.

influencing English stress, but interestingly not all prosodic constructs were transferred from French to English. Neither the monolingual nor the bilingual children preserved heavy weak syllables more than light weak syllables in French; however, in English, monolingual children preserved heavy initial syllables more than light initial syllables while the bilingual children produced heavy and light initial syllables similarly. Therefore, between-language interaction was occurring on some linguistic constructs (e.g., heavy versus light *initial* syllables) but not on others (e.g., heavy weak syllables versus light weak syllables). This finding contributed to a new paradigm for thinking about how the two phonologies of bilingual children are organized and interact.

Other aspects of prosody have been examined in bilingual children as well. Lleó (2006) examined foot binarity in German-Spanish-speaking 2-year-olds in order to determine if the acquisition of phonological words could exemplify interaction in bilingual acquisition. Prosodic constraints were chosen to exemplify possible between-language interaction between German and Spanish because German has many more final consonants and fewer trochees (i.e., Strong-Weak syllables) than Spanish. Thus, these differences between languages on prosodic features could possibly be transferred, acquired at an accelerated rate, or acquired at a decelerated rate by bilinguals as compared to their monolingual peers. Through the examination of three bilingual German-Spanish speaking children, the researchers found that bilingual German-Spanish-speaking children acquired unfooted syllables at a slower rate than the monolingual Spanish-speaking children, indicating between-language interaction in the form of deceleration. However, bilingual children demonstrated a similar rate of acquisition of prosodic structure overall when compared to their monolingual Spanish-speaking peers, which could indicate a *variation* of acceleration (Fabiano-Smith & Goldstein, 2010b) in bilingual acquisition. More specifically, as described in Fabiano-Smith and Goldstein (2010b), it is possible that the ability to maintain the same rate of acquisition in two languages, as compared to children learning only one language, could indicate a more rapid rate of development in bilinguals as compared to monolingual children. In essence, bilingual children are acquiring “double” the phonological structure in the same amount of time.

Lleó and her colleagues had also considered questions related to between-language interaction, specifically in the prosodic domain, in work prior to her 2006 study. Lleó, Kuchenbrandt, Kehoe, and Trujillo (2003) examined the acquisition of syllable-final consonants in Spanish-German bilingual children. Syllable-final consonants were selected because German phonology permits multiple final consonants and complex codas while Spanish permits only a limited number of final consonants and favors an open, as opposed to closed, syllable type. This distinction is similar to that of Puerto Rican Spanish and English (to be discussed), in that German and English are similar in this regard. The researchers hypothesized, as we do in the current study, that because German and Spanish contrast significantly on this phonological feature, it might be possible that production of final consonants by bilingual German-Spanish-speaking children could provide an opportunity to observe between-language interaction. Five bilingual German-Spanish-speaking children were examined and compared to their monolingual peers on accuracy of coda production in both languages. The researchers found that bilingual children demonstrated significantly

higher accuracy on coda consonants than monolingual Spanish-speakers between the ages of 2;1-2;4, indicating that German phonology was influencing Spanish phonological acquisition. This finding provided not only evidence of between-language interaction, but also what is referred to as acceleration (also referred to as *bilingual bootstrapping*) in bilingual phonological acquisition (Gawlitzek-Maiwald & Tracy, 1996; Paradis & Genesee, 1996) in which bilingual children demonstrate, at times, a faster rate of acquisition as compared to their monolingual peers on certain linguistic structures. The current study aims to answer similar questions to determine if evidence from Puerto Rican Spanish-English bilinguals coincides with German-Spanish bilinguals.

Taken together, the results of recent group studies examining prosodic characteristics and syllable structure in bilingual children indicate that (1) bilingual children, by and large, maintain separation between their two phonologies; (2) the two separate systems of bilinguals interact infrequently; and (3) interaction is most often observed on linguistic constructs that differ, or have conflicting phonological markedness constraints, between the bilingual child's two languages. Examining conflict between a bilingual child's two phonologies, and how bilingual children handle this conflict, motivates the current study. Puerto Rican Spanish and English conflict in terms of their phonological patterns and this conflict between languages could provide an opportunity for between-language interaction to occur. We aim to observe what bilingual Puerto Rican Spanish-English speaking children do when they come across conflicting phonological markedness constraints. Do they remain faithful to the dialect features of Puerto Rican Spanish or will we see the influence of English on their Spanish productions decelerating the acquisition of or preventing the use of dialect features? This exploratory investigation aims to answer this question to further our theoretical understanding of phonological acquisition in this population.

1.2 Puerto Rican Spanish and English: A Comparison

English and Puerto Rican Spanish differ in terms of their *phonological markedness constraints*. Phonological markedness constraints are responsible for simplifying structure, or preventing marked structure from occurring, in particular contexts. The current study focuses on a specific type of dialect feature in Puerto Rican Spanish that has been described by Guitart (1997) as *dropping* (i.e., deletion). Spanish allows few final consonants (/s, n, ɾ, d, l/), and speakers of this radical dialect of Spanish, at times, omit them. Specifically, dropping in Puerto Rican Spanish is characterized by the omission of phonemes such as /s/ and /d/ in coda position (e.g., [ma] for *más* “more”). In some instances nasals in coda position are also dropped and marked as nasalization on the remaining phone (e.g., [pã] for *pan* “bread”). Less frequently the flap /ɾ/ is omitted when it occurs in coda position of an infinitival verb form (e.g., [kome] for *comer* “to eat”). Contrastively, English encourages the use of final consonants, as all consonants can occur in final position with the exception of /h, j, w/ (Stoel-Gammon & Dunn, 1985). In addition, Puerto Rican Spanish allows fewer contrasts in coda position (when final consonants are present) (Goldstein & Cintrón, 2001). On the other hand, English favors a more complex system of final consonants, with Consonant-Vowel-Consonant (CVC) being a preferred syllable type (e.g., Kessler & Treiman, 1997).

In addition to modifications of syllable structure, another aspect of Puerto Rican Spanish that motivates the current study is the type of sound substitutions (i.e., the use of allophones in place of mainstream Spanish targets) that characterize this dialect. Modifications of this type are variable; thus, as with the dropping of final consonants, sound substitutions will not occur consistently within or across speakers. The discussion of sound substitutions in the current study focuses on sound *complexity*, or *markedness*. Sounds are deemed *simple* or *complex* based on general acquisition patterns and language typologies (Jakobson, 1968; Maddieson, 1984). More specifically, speech sounds are typically acquired in a simple-to-complex, or an unmarked-to-marked fashion; simple sounds are easier to produce than complex sounds, and therefore, are acquired earlier. For example, the flap and trill are highly complex sounds, as based on the fact that they tend to be produced in error by typically-developing children sometimes up until age 7;0 (Bedore, 1999; De La Fuente, 1985). Speakers of Puerto Rican Spanish substitute more complex sounds, such as /x/, flap /ɾ/ and trill /r/ (Acevedo, 1993), with less complex sounds, such as [h] and [l]. For example, substitutions such as [l] for the flap /ɾ/, the flap /ɾ/ for the trill /r/, and [h] for the voiceless velar fricative /x/ all involve a less complex, or less marked, sound as a substitute for a more complex, or more marked, target phoneme. On the other hand, dialect features of Puerto Rican Spanish, such as the substitution of /ʃ/ for /ʧ/, /ŋ/ for /n/, or /ɸ/ for /f/ do not involve substituting a less complex sound for a more complex sound, as they are relatively similar in complexity (Jakobson, 1968). The current study asks if it is possible that Puerto Rican Spanish-speaking children, monolingual and bilingual, could be using dialect features that utilize less complex sounds, such as [l], to aid in production of significantly more complex sounds, such as the flap /ɾ/. Bilingual children could be using this type of substitution pattern more than monolingual Spanish-speakers because they have been found, at age 3;0, to demonstrate lower accuracy on consonants overall as compared to their age-matched monolingual peers (Fabiano-Smith & Goldstein, 2010a) and on flap and trill specifically (Fabiano-Smith & Goldstein, 2010b). Thus, the dialect features of Puerto Rican Spanish could be used as a means to avoid production of highly complex sounds, especially in 5- and 6-year-old bilingual children who might exhibit deceleration in acquisition of the flap and trill due to between-language interaction.

1.3 Dialect Density

Dialect speakers exhibit a great deal of variability in their use of dialect features, both within and across speakers (Guitart, 1997). According to Oetting and McDonald (2002), examining quantitative differences between speakers on dialect use might shed light on the underlying rule system of a speaker. Examining how frequently bilingual children use dialect features in their speech could be a way to observe how they handle conflicting phonological rule structure between Puerto Rican Spanish and English. In addition to quantitative differences, qualitative examination of how Puerto Rican Spanish-speaking children use their dialect features will allow us to observe constraints that dictate feature use. Differences in phonological markedness constraints could serve as evidence for how the underlying phonological representation of bilingual children is organized if English phonological properties are found to be restricting the use of dialect features in Puerto Rican Spanish. The current study aimed to take both a quantitative and qualitative approach to dialect feature analysis in order to observe differences in the frequency of use of dialect features. Such an

approach would allow for determining where underlying rule structure differs between monolingual and bilingual Puerto Rican Spanish speakers.

2. Research Questions

The research questions motivating the current study were:

1. Will dialect features be used with less frequency in bilingual Puerto Rican Spanish-English bilinguals than in Puerto Rican Spanish-speaking monolinguals due to the presence of English phonological structure in bilingual children?

We predicted that bilingual Puerto Rican Spanish-English-speaking children would use fewer dialect features, or exhibit lower dialect density, than their monolingual Puerto Rican Spanish-speaking peers due to the influence of English phonology on Spanish phonology. Because the phonological markedness constraints of English prefer CVC syllable structure and allow numerous contrasts in coda position, we predicted that the influence of English would limit the occurrence of patterns such as final /s/ deletion in Puerto Rican Spanish. Because of this, we predicted that bilingual children would use a less diverse set of dialect features in their Spanish productions while monolingual Spanish-speaking children would exhibit a variety of features at a high frequency. Evidence of between-language interaction could be observed if bilingual Puerto Rican Spanish-English speaking children do not exhibit Puerto Rican dialect features that conflict with the English phonological system (e.g., deletion or neutralization of final /s/). If bilingual children use the same types of dialect features and with the same frequency as monolingual Puerto Rican Spanish speakers, there would be no evidence of between-language interaction.

1. Are bilingual children more likely than monolingual Spanish speakers to use dialect features to aid in (i.e., as substitutes for) the production of more complex sounds of a dialect (e.g., the Spanish trill)?

We predicted that bilingual Puerto Rican Spanish-English-speaking children would use certain dialect features to aid in the production of more marked sounds within the dialect but that monolingual Spanish-speaking children would not (or would do so at a lower frequency). Some Spanish phonemes, like the trill /r/, are highly complex (e.g., Maddieson, 1984) and bilingual children have to acquire two phonologies in the same amount of time that monolingual children have to acquire only one. It might be possible that bilingual children are more likely to use dialect features that substitute a less complex sound for a significantly more complex sound, such as [l] for /ɾ/, over features that modify sounds similar in complexity, such as /ʃ/ for /ʧ/, /ŋ/ for /n/, or /ɸ/ for /f/. Not all speakers of Puerto Rican Spanish will use dialect features that modify a more complex sound, such as the /r/, with a less complex sound, such as /l/; many will produce these complex sounds. Therefore, bilingual children will have more than one option in their dialect, but might prefer to modify highly complex sounds more frequently to aid in production. If monolingual Puerto Rican Spanish-speaking children demonstrated similar usage, we could not claim these modifications are specific to bilingual acquisition, but rather characteristic of Puerto Rican Spanish use in general.

3. Methodology

3.1 Participants

Twelve typically-developing children participated in the current study: Six functionally monolingual Puerto Rican Spanish-speaking children ($\bar{x}$ = 5;6, range 5;2 - 7;1) and six bilingual Puerto Rican Spanish-English speaking children ($\bar{x}$ = 6;6, range 6;2 - 6;10) (Table 1). Participants were drawn from a larger study of monolingual and bilingual Puerto Rican Spanish-English-speaking bilingual children (see Goldstein, Bunta, Lange, Rodriguez, & Burrows, 2010). This database consists of transcripts from monolingual and bilingual Spanish and English-speaking children from North Philadelphia, Pennsylvania. The Puerto Rican community of North Philadelphia is described in Poplack (1978) and is very similar to the Puerto Rican community in New York City described by Zentella (1997) and supported by current United States census data (United States Census Bureau, 2010). This community is a delineated area that is distinct from its surrounding communities, as it has been historically Puerto Rican for approximately 50 years. The people who live in this community generally identify in a positive way to their heritage and language, thus they are not stigmatized for using their dialect of Spanish with others in their schools, stores, and businesses. The teachers and aides in the classrooms where these data were collected were speakers of Puerto Rican Spanish and Spanish was spoken frequently in the classrooms. In some preschools, Spanish is the primary language spoken; therefore, it was possible to obtain data from children who were predominantly monolingual Spanish speakers. Both predominantly monolingual Spanish speakers and bilingual Spanish-English speakers live in the same community, go to the same schools, and use the same dialect of Spanish. The use of the standard variety of Spanish in the United States, the conservative Mexican variety (Lipski, 2000), is not typically heard in this community. Although multiple dialect varieties of English exist in the northeastern United States, the children in this study did not demonstrate the influence of African-American English, or any other non-mainstream variety, in their English speech.

Information pertaining to each subject's chronological age, sex, language status, language history (e.g., sequential or simultaneous acquisition), dialect of Spanish, Spanish proficiency, English proficiency, and the percent input and output in both English and Spanish was obtained from parent questionnaire (after Gutierrez-Clellen, Restrepo, & Simon-Cereijido, 2006; Peña, Bedore, & Rapazzo, 2003). A Mann Whitney U nonparametric test for independent samples (Mann & Whitney, 1947) showed that the bilingual group ($\bar{x}$ = 6;6) was not significantly older than the functionally monolingual group ($\bar{x}$ = 5;6) ($z = -1.92$, $p = .054$). Phonological skills between Spanish-English monolingual and bilinguals are typically commensurate by 5 years of age (Goldstein, Fabiano, & Washington, 2005), thus children older than 5;0 were chosen for the current study. Dialect features, which are present in speakers of all ages, were the focus of the investigation rather than phonological ability, which could be influenced by chronological age.

3.1.1 Bilingual children—Both simultaneous bilinguals and sequential bilinguals were included in the study. Children in this study were classified as *early bilinguals* (Genesee, Paradis, & Crago, 2004) because all of them began acquiring both of their languages before

age 4. Data collection sites consisted of bilingual preschool programs in which a combination of English and Spanish is used in most classrooms. Children labeled as sequential bilinguals have at least some exposure to English before entering preschool, due to the bilingual nature of the community, even if parents reported that they were receiving only Spanish input in the home. Families that use both English and Spanish in the home have typically resided in the United States for at least one generation, where families that use mainly Spanish in the home are families that have more recently relocated to the United States from Puerto Rico (Poplack, 1978). When children reach the age of approximately 3 years old, they enter preschool programs that employ the use of both languages, and by the end of their first year of English exposure, demonstrate phonological skills that are similar to monolingual speakers of either language (Fabiano-Smith & Goldstein, 2010b).

Bilingual children are a heterogeneous group, whether they are acquiring two languages from birth or have exposure to primarily one language in the home until entering preschool. For example, some bilingual children might be exposed to both languages from birth, but the exposure in one language might be relatively small over time in comparison to exposure in the other language. Meanwhile, children who are acquiring two languages in a sequential manner might have relatively equal exposure in both languages, leading them to be more "balanced" bilingual speakers, even if they began bilingual acquisition later than their simultaneous peers. For this reason, detailed measures of language input and output were gathered for all children included in the study, regardless of language history. Parents and teachers were asked how many hours per day a child was exposed to each language (i.e., input) and how many hours per day a child actually used each language (i.e., output). These values were calculated separately for weekdays and weekends. Activities the child participated in, who he or she interacted with, what language was used by the child, and what language was used by his or her interlocutors during those interactions was recorded. Peer interaction, as well as parental interaction, was taken into consideration when calculating measures of input and output because peer interaction has been found to be a more significant predictor of language proficiency than parental input (Rojas, Bunta, Iglesias, & Goldstein, 2007). Overall percent input and output in each language was calculated by multiplying the number of hours of exposure (input) and use (output) by 100, then dividing that number by the total number of waking hours in the week. Bilingual children need at least 20% exposure to a language in order to use it (Pearson, Fernandez, Lewedeg & Oller, 1997), therefore all bilingual participants had at least 20% input in both languages and used each language at least 20% of the time. In addition, parents and teachers were asked to rate each child's language proficiency on a scale from 0 to 4 (a score of 0 represents that a child cannot speak the language at all and a score of 4 represents that a child has native-like proficiency in the language) (Peña, Bedore, & Rapazzo, 2003; Peña, Bedore, & Zlatic-Giunta, 2002). All bilingual children included in the current study were rated as either 3 or 4 by their parents in both English and Spanish, indicating a high level of proficiency in both languages. This particular method was used because Gutiérrez-Clellen and Kreiter (2003) (for narrative skills) and Goldstein, Bunta, Lange, Rodriguez, and Burrows (2010) (for phonological skills) found that parent ratings of proficiency and language input significantly correlate with a bilingual child's proficiency. Ensuring that children exhibit high proficiency in both languages excluded typically-developing children

who demonstrate deviations in their speech due to little experience with either English or Spanish.

3.1.2 Functionally monolingual children—There is inherent difficulty in obtaining study participants that have input in only one language. For this reason, we included children in our study that were not entirely monolingual, but who do not have enough input in English to be functionally bilingual. This group is referred to as *functionally monolingual* Spanish-speakers, and acted as our control group. Children included in this group had less than 10.5% input and output in English and were judged by their parents as a 1 or 2 on the English proficiency scale. These children were exposed to and used Puerto Rican Spanish 90-100% of the time and demonstrated very low proficiency in English. This means of classification has been used in previous studies (e.g., Goldstein, Fabiano, & Washington, 2005) due to the difficult task of finding truly monolingual Spanish-speaking participants in the United States.

3.2 Data Collection

Spanish single word samples were collected from each child using the phonology subtest of the *Bilingual English-Spanish Assessment* (BESA) (Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, in development). This single word tool tests 28 separate target items for Spanish. There were 25 opportunities per sample for children to use dialect features of Puerto Rican Spanish. This assessment has been used previously with bilingual children (e.g., Fabiano-Smith & Goldstein, 2010a; Fabiano-Smith & Goldstein, 2010b; Goldstein & Washington, 2001; Goldstein, Fabiano, & Washington, 2005). Each target item was elicited via a spontaneous label made in reference to a photograph. If the child did not label the photograph spontaneously, the function of the item was provided to the child. If the child still did not label the item, delayed imitation was used. Goldstein, Fabiano, and Iglesias (2004) examined the spontaneous and imitated productions of Spanish-speaking children with phonological disorders and found that their imitated productions were not more adult-like (i.e., correct) than their spontaneous productions. Due to the negligible difference between spontaneous and imitative forms, using delayed imitation was not thought to affect our results. Data from the single word samples were phonetically transcribed with diacritics using the *Logical International Phonetics Program* (LIPP) (Oller & Delgado, 2000) and the *International Phonetic Alphabet* (IPA). Reliability of phonetic transcription for this sample was completed after a 4-week interval on 30% of the sample selected randomly. Both interjudge and intrajudge reliability was 99% for both English and Spanish (Goldstein, Bunta, Lange, Rodriguez, & Burrows, 2010, p. 242).

3.3 Analyses

3.3.1 Dialect density—In Oetting and McDonald (2002), three distinct assessment approaches were examined to determine which measure best characterizes non-mainstream dialect. The three approaches assessed were listener judgment ratings, type-based counts of non-mainstream pattern use, and token based counts. Oetting and McDonald's (2002) study included the language sample of 93 children from Oetting and McDonald (2001). Non-mainstream dialects represented in the samples included Southern White English (SWE) and Southern African American English (SAAE). The authors determined that the rate at which

the participants produced the non-mainstream patterns was best characterized by token based methods. For this reason, the method of using token based counts used by Oetting and McDonald (2002) was adapted for phonology in the current study. This particular measure was used to identify the number of features monolingual Spanish-speakers produced in comparison to the number of features produced by the bilingual speakers. Token frequency was used as the numerator and total number of words on the phonology subtest (28) was used as the denominator. The total number of obligatory contexts for the dialect pattern was not used as the denominator due to the variable use of dialect patterns and the fact that one context can trigger more than one dialect pattern (i.e., The sounds [x], [h], or [ɾ] can all be used as substitutes for the trill /r/) (Oetting & McDonald, 2002; Guitart, 1997). Dialect density was calculated for both monolinguals and bilinguals separately.

3.3.2 Dialect features used—The current study examined the dialect features of Puerto Rican Spanish published in Goldstein (2001) (Table 2): Deletion of /d/; deletion of /k, g/; substitution of the voiceless bilabial plosive [ɸ] for /f/; deletion or aspiration of final /s/; substitution of [h] for /x/; substitution of the voiceless palatal fricative [ʃ] for the voiceless postalveolar affricate /ʧ/; substitution of velar nasal [ŋ] for /n/ in coda position; substitution of [l] for flap /ɾ/; substitution of the uvular trill [ʀ] or [x] for /r/, and the substitution of flap [ɾ] for /l/. Because dialect speakers exhibit a great deal of variability in their use of dialect features, both within and across speakers (Guitart, 1997), children's productions were examined for occurrences of each type of feature indicated in Goldstein (2001), but were not expected to produce tokens of all possible dialect features.

3.3.3 Statistical analyses—Mean dialect density was calculated and analyzed statistically using a nonparametric Mann-Whitney U test to determine if monolinguals demonstrated a significantly higher dialect density than bilinguals. The Mann-Whitney U test, the nonparametric alternative to the independent samples t-test, was used to control for variability in our sample due to the relatively small number of subjects and to prevent Type II error from occurring. Language groups were then compared statistically using the nonparametric Mann-Whitney U test to determine if monolinguals and bilinguals exhibited statistical differences in types of dialect features used.

4. Results

4.1 Dialect Density

The results of the Mann Whitney U test comparing dialect density between monolinguals and bilinguals showed no significant difference between the two groups ($z = -.566$, $p = .571$). Contrary to what was predicted, this finding indicated that monolingual Puerto Rican Spanish-speaking children did not use dialect features at a significantly higher frequency than bilingual Puerto-Rican Spanish-English-speaking children (Table 3).

4.2 Dialect Features Used

Both monolingual and bilingual children exhibited only a subset of the dialect features listed in Goldstein (2001) (Figure 1). They did not produce any instances of [ɸ] (voiced bilabial fricative) for /f/, /s/ aspiration, or [ŋ] (velar nasal) for /n/. Of the subset of features that the

children did produce, no significant differences between monolinguals and bilinguals on frequency of occurrence were found: /d/ deletion ($z = -1.00$, $p = .317$), /k, g/ deletion ($z = -1.00$, $p = .317$), /s/ deletion ($z = -1.48$, $p = .138$), [ʃ] (voiceless postalveolar fricative) for /ʧ/ (voiceless postalveolar affricate) ($z = -.638$, $p = .523$), [l] for /ɾ/ (flap) ($z = -.587$, $p = .557$), [x] for /r/ (alveolar trill) ($z = -.422$, $p = .673$), [ɾ] for /r/ ($z = -.287$, $p = .774$), [h] for /r/ ($z = -.123$, $p = .902$), [h] for /x/ (voiceless velar fricative) ($z = .000$, $p = 1.00$), [ʀ] (uvular trill) for /r/ ($z = -.123$, $p = .902$), or [ɾ] for /l/ ($z = .000$, $p = 1.00$).

Overall, monolingual and bilingual children were exhibiting dialect features at the same frequency; however, qualitative analysis of feature type indicated that monolingual children used a greater variety of dialect features than did bilingual children (Figure 1). For example, monolingual children produced examples of /d/ deletion, /k, g/ deletion, [x] for /r/, and [h] for /x/; the bilingual children did not use these features at all. The most frequently occurring dialect features for both monolinguals and bilinguals were /s/ deletion and [l] for /ɾ/ substitution. Interestingly, bilingual children exhibited more tokens of final /s/ deletion than the monolingual children, contrary to what was predicted. In addition, both monolingual and bilingual children used dialect features that modify more marked sounds, such as the substitution of the less marked [l] for the more marked /ɾ/, at a similar frequency. Thirteen bilingual children used the [1] for /ɾ/substitution as compared to 11 monolingual Spanish-speaking children. A similar pattern was found for /s/ deletion, as 15 bilingual children exhibited this feature as compared to 8 monolinguals.

Individual child data also yielded interesting findings. Child S1 exhibited the highest frequency of dialect features in his sample (12). He exhibited /s/ deletion, [l] for /ɾ/ and [ɾ] for /r/ most often. Child S5 exhibited the lowest frequency of dialect feature use (2), but exhibited the same pattern as Child S1. He exhibited one token of /s/ deletion and one token of [l] for /ɾ/ substitution. Child S4 exhibited four tokens of dialect features, also exhibiting the [l] for /ɾ/ substitution along with one token of [ʃ] for /ʧ/ and two tokens of [ɾ] for /r/.

Individual differences were also observed in the bilingual group. Child B4 exhibited the highest frequency of dialect feature use (10), exhibiting two tokens of /s/ deletion, four tokens of [l] for /ɾ/, one token of /ɾ/ for /r/, one token of [x] for /r/, and two tokens of [ʀ] for /r/. This was the only child who used the [ʀ] for /r/ substitution in both the bilingual and monolingual groups. Child B2 exhibited the lowest frequency of dialect features (3), focusing on /s/ deletion and [l] for /ɾ/ substitution. Three out of the six bilingual children exhibited seven tokens of dialect feature use. In addition to the common /s/ deletion and [l] for /ɾ/ substitution, Child B3 exhibited [ʃ] for /ʧ/ and Child B5 exhibited [h] for /ɾ/ and [x] for /ɾ/.

Subsequent examination of the Spanish trill /r/ was performed because bilinguals and monolinguals both favored modification of highly complex sounds over other types of dialect features. Trill modification was examined in detail for both language groups. Monolingual and bilingual children showed similarities in how they modified the Spanish trill except for the feature [x] for /r/ (bilingual children did not exhibit this feature at all). This led to the subsequent examination of bilingual children's productions of the trill. Upon further examination, it was found that bilingual children, by and large, maintained target

production of the trill (21 occurrences), with the substitution of [ɾ] for /r/ as the next most frequent modification (5 occurrences). Bilingual children also used the substitutes [k] (2 occurrences), [x] (2 occurrences), and the uvular trill [ʀ] (2 occurrences), and less frequently [l] (1 occurrence), [g] (1 occurrence), [h] (1 occurrence), and the glide [j] (1 occurrence). There was only one instance of trill /r/ deletion in word-initial onset position. Finally, Child B1 displayed the use of the English approximant [ɹ] for the Spanish flap /ɾ/ (1 occurrence) and trill /r/ (1 occurrence), indicating the type of between-language interaction referred to as phonological transfer (e.g., Paradis & Genesee, 1996). This finding is consistent with previous studies that have found a very low occurrence of segmental transfer between languages in bilingual children (e.g., Fabiano-Smith & Goldstein, 2010b; Fabiano & Goldstein, 2005; Keshavarz & Ingram, 2002). Surprisingly, bilingual children did not demonstrate difficulty with trill production in that they were not utilizing dialect features to aid in the production of the trill /r/. Interestingly, both monolingual and bilingual children used the feature [l] for /ɾ/ at a high frequency, which is the substitution of a more complex sound with a less complex sound. It should be mentioned, however, that this substitution pattern is frequent in Spanish, regardless of dialect (Goldstein, 2005).

5. Discussion

The current study aimed to determine if, due to between-language interaction, the phonological markedness constraints of English (1) restrict the use of dialect features in the Spanish productions of bilingual Puerto Rican Spanish-English-speaking children (e.g., cause bilingual children to use less dialect features that drop final consonants) and/or (2) cause bilingual Puerto-Rican Spanish-English-speaking children to utilize dialect features to aid in the production of highly complex sounds in Puerto Rican Spanish (i.e., deceleration could be occurring in bilingual acquisition). The results of this study indicated that (1) the phonological markedness constraints of English do not appear to restrict the use of Puerto Rican Spanish dialect features because no significant difference was found between monolinguals and bilinguals on dialect density and (2) monolingual *and* bilingual children seemed to be using dialect features to aid in the production of more difficult sounds in their dialect, as both speaker types routinely modified the flap /ɾ/, trill /r/, and dropped final /s/.

Few differences were found between monolingual and bilingual children, indicating that bilingual children, at certain points in development, exhibit phonological characteristics that are similar to, but not identical to, their monolingual peers (Fabiano-Smith & Goldstein, 2010a; Fabiano-Smith & Goldstein, 2010b; Goldstein, Fabiano, & Washington, 2005). The monolingual and bilingual children in this study, overall, used dialect features of Puerto Rican Spanish at the same frequency. However, monolingual children use a wider variety of dialect features as compared to bilingual children, suggesting that English might be restraining dialect use in bilingual children, but not in the way that was predicted. It was expected that bilingual children would not use *dropping* features such as deletion of /s/ in coda position because English encourages the use of coda consonants; however, bilingual children deleted /s/ in coda position at a slightly higher (though not significantly higher) frequency than monolingual Spanish-speakers. However, due to the exploratory nature of this study, and low number of subjects, this interpretation should be made with caution. The monolingual group demonstrated more diversity of dialect feature use, but the number of

tokens for each feature type was small. Bilingual children did not produce any tokens of /d/ deletion, /k, g/ deletion, [x] for trill /r/, or [h] for /x/. Bilingual children also did not simplify /x/ to [h], which was surprising, given that /h/ is part of the English phonemic inventory and /x/ is not. This provided a perfect opportunity for between-language interaction to occur. The fact that bilingual children did not maximize this common element between English and Spanish suggests that bilingual children do, for the most part, maintain separation in phonological representation, in support of the *Dual Systems Model* (Paradis, 2001).

It was also predicted that bilingual children might use trill modification features with a high frequency, because all substitutions (with the exception of perhaps the uvular trill) employ a less complex sound as a substitute for a more complex sound. It was found, however, that bilinguals and monolinguals both favored modification of highly complex sounds (e.g., [l] in place of flap /ɾ/) over dialect features that modify sounds similar in complexity (e.g., /ʃ/ for /ʧ/). Bilingual children did not modify relatively unmarked sounds at all and monolinguals did so only twice. Modification of marked sounds, on the other hand, occurred frequently in both groups of speakers. It could be possible, based on these preliminary data, that Puerto Rican Spanish-speaking children, both monolingual and bilingual, are more likely to modify a more marked sound if the substitute is *significantly* less marked than the target. For example, both the fricative /x/ and the trill /r/ are highly complex sounds in Puerto Rican Spanish. It is possible that children are not likely to substitute one complex sound for another. The liquid /l/, however, is an unmarked sound in Puerto Rican Spanish that is present at the lowest level of typological complexity in the phonetic inventory of 3-year-olds, both Mexican-speaking monolingual and Puerto Rican Spanish-speaking bilingual children (Fabiano-Smith & Barlow, 2010). It is possible that if the dialect feature employs the use of a highly complex substitute, such as [x], children tend not to use it as a substitute for another highly complex sound, such as the trill. On the other hand, a sound such as [l] might be looked upon as optimal, since its ease of production contrasts significantly with the target (i.e., the complex flap /ɾ/). Therefore, the phonological representation of Puerto Rican Spanish-speaking children might be organized in such a way that sound substitutions are made based on the relative markedness of the sounds in their particular phonetic inventory. This study is exploratory in nature, however. This interpretation should be supported by data from a larger and more diverse data set in order to definitively state that this is the case.

Variables other than phonological representation could also be motivating our findings. Firstly, it is possible that the input that the children are hearing in their environment, or the adult model, is reflected in the dialect use of the children. If this is the case, we cannot attribute differences in dialect use between monolinguals and bilinguals to the presence of English phonology in their representation, but rather we would attribute differences across groups to differences in dialect features used by their parents. One of the main reasons that parental input is not thought to be a factor in the use of dialect by children is that it is well accepted in the literature that peer influence is a much stronger predictor of language and dialect use than parental input (e.g., Labov 1964; Weinreich, Labov & Herzog, 1968; Payne 1976; 1980; Poplack, 1978; Rojas, Bunta, Iglesias, & Goldstein, 2007). Stanford (2008) studied children in rural Chinese communities who were reared with two differing dialects

in their ambient linguistic environment. He found that children rarely exhibited the dialect features used by their mothers and typically utilized the paternal dialect features in adulthood, even though maternal input was most frequent during childhood. Oetting and Pruitt (2005) examined the language samples of teen mothers conversing with their 3-year-old children and found that the children and teen mothers exhibited some dialect features of African-American English (AAE) that did not overlap. For example, the mothers used features such as zero *have* and *go* copula. These features were not found in the language samples of their 3-year-old children. In addition, the children exhibited the features zero present progressive, zero infinitive *to*, and the preposition *for*, which were absent in the language of their mothers. Tse and Ingram (1987) examined the acquisition of two dialects of Cantonese in a young girl, age 1;7 to 2;8, and found that the dialect features that she used were inconsistent with the dialect of her mother *and* her father. In addition, Díaz-Campos (2011) explains that it is difficult to quantify the amount of time that children spend with their parents versus other speakers of the dialect and that members of the same family (for example, mothers and fathers) will exhibit different idiolects or different dialects altogether. Therefore, caution should be taken when assuming that children will use dialect features that mirror those of their parents. Labov (1991) states, “In the great majority of cases that we have studied or encountered, children follow the pattern of their peers” (p. 304). In addition, Payne (1976, 1980) states, “In families that had in-migrated to Philadelphia from other parts of the U.S., children acquired most of the local phonetic features, being strongly influenced by their peers, even when parental influence is maximal” (1980, p. 157). He also states, “Even complex features, though incompletely acquired by the in-migrant children, nonetheless showed a ‘shift in the direction’ of their peers, rather than their parents” (1976, p. 238). Poplack (1978) examined dialect use of bilingual Puerto Rican Spanish-English children in the same Puerto Rican community that was examined in the current study and found that while “80% of the [school-aged] children reported that their [first generation American] parents speak mostly, if not only, Spanish to them, 90% speak mostly, if not only, English to their siblings” (p. 90). Overall, studies examining parental input and children's use of dialect features show that children are not simply mirroring the dialect features used by their parents, but are exhibiting idiolects of their own. Therefore, we would argue that between-language interaction is a more likely explanation for our findings than is parental input.

Secondly, another aspect of the children's environments that should be considered when examining frequency of dialect use is that of sociolinguistic variables such as stigmatization of the dialect, language attrition, and social identity. It is possible that one or more of these social variables could be motivating dialect density in these bilingual children rather than between-language interaction. Both predominantly monolingual Spanish speakers and bilingual Spanish-English speakers live in the same community, go to the same schools, and use the same dialect of Spanish. The use of a standard variety of Spanish is not typically heard in this community, if at all. It is not likely that for children of this age, within the safety of this particular linguistic community, that stigmatization of this dialect would occur. Other social variables that contribute to differences in dialect use across generations have been examined by Dubois and Noetzel (2005). They found that not only does language attrition contribute to differences in dialect use between younger and older generations, but

also that social identity affects frequency of dialect feature use in older and younger generations of dialect speakers. These variables would not be driving differences between the predominately monolingual and bilingual preschoolers of the same generation in the current study, but make a strong case for possible differences that most likely exist between parent and child output. We would argue that, in this case, the restriction in use of dialect features by the bilingual group is more likely due to the presence of a restrictive phonology (English) than a linguistically restrictive community.

Overall, some evidence for between-language interaction was observed in the form of (1) a restricted set of dialect features used by bilingual children in comparison to monolinguals and (2) phonological transfer in child B1, supporting the *Dual Systems Model* (Paradis, 2001). Studies supporting this model have found the phonologies of bilingual children to be separate, but non-autonomous, using phonological transfer as evidence (e.g., Paradis, 2001; Keshavarz & Ingram, 2002; Fabiano-Smith & Goldstein, 2010b). Interestingly, bilingual children, by and large, maintained separation between English and Spanish. Bilingual children used a variety of dialect features at the same rate as monolingual Puerto-Rican Spanish speakers, indicating that the phonological markedness constraints of English do not appear to impact dialect use in bilingual Puerto Rican Spanish-English speaking children. The two languages of the bilingual children in this study, however, were not completely autonomous (Paradis, 2001). There was evidence for a low level of between language interaction since the types of dialect features used by bilinguals were not identical to those of monolingual speakers and evidence of phonological transfer was present (Paradis & Genesee, 1996). In addition, we were able to observe how all speakers of Puerto Rican Spanish, both bilingual and monolingual, utilize dialect features as substitutes for more difficult sounds of their language. Overall, bilingual and monolingual children are similar, but not identical, in their use of Puerto Rican Spanish dialect features, furthering our understanding of the theoretical models that account for bilingual phonological acquisition.

6. Clinical Implications

The results of this study have clinical implications for speech-language pathologists (SLP) who routinely perform assessment and intervention with bilingual preschoolers. There is no normative data available for SLPs to determine what typical acquisition looks like in bilingual phonology, let alone how disorder might present itself in a system that manages two languages. In addition, most research has focused on mainstream varieties of Spanish and has not examined how disorder might present itself in a bilingual speaker of a nonstandard dialect. Determining the characteristics of typical phonological acquisition in bilingual Spanish-English speaking children, and speakers of differing dialects of those languages, will aid in identification of language difference (i.e., differences between monolingual and bilingual speakers due to the presence of more than one phonology) from language disorder (i.e., an underlying language-learning disability). If clinicians have a knowledge base for how bilingual children acquire their two languages, they will be able to identify when something in that process is atypical. This improvement in clinical practice will reduce the amount of bilingual children overdiagnosed with speech sound disorders. Theoretically, knowledge of how bilingual children acquire their phonologies will aid in our

understanding of how all children learn language and inform more diverse theories of bilingual phonological representation and acquisition.

7. Study Limitations and Future Directions

Because this study was exploratory in nature, single word speech samples were used for analysis of dialect features. Single word production tends to preserve more phonological information; whereas, connected speech could provide a greater opportunity for dialect features to be used. The formality of a single word test could cause children to suppress their use of dialect features; thus, natural conversation would provide a better context for observing differences between language groups. In addition, the single word test used was limited to only 28 words. Future studies examining these questions should employ a larger and more diverse data set, consisting of both single word and connected speech samples for analysis. Based on our findings, future research could address a number of new predictions. Future studies could compare additional language pairs, other than Puerto Rican Spanish and English, which have conflicting phonological rules. For example, languages that differ on almost all aspects of phonology (e.g., English and Mandarin) could be examined to observe how between-language interaction n occurs. These comparisons might lead to less ambiguous findings than when two similar languages are examined. It would also be interesting to examine the type of input that these children were exposed to in their ambient language environment to observe the dialect features, and the frequency with which those features are used, in the adult and peer models. Future studies will include the collection of adult and peer data for comparison. Also, a substitution error analysis examining the phonetic salience of the targets and substitutes that children exhibit would also shed light on other possible motivators for the type and frequency of dialect features used in child speech. It could be possible that children select certain sounds as substitutes because they are easier to perceive in their input or that bilingual children are selecting dialect features that maintain a maximal contrast between languages. Finally, examining similarities and differences between monolinguals and bilinguals in terms of structural complexity could also increase our knowledge of how between-language interaction takes place. For example, syllable types that occur in many languages may be viewed as less complex (e.g., a consonant-vowel, or CV, syllable) as compared to syllable types that are not common across many languages of the world (e.g., CCCVCCC). English allows 3-member (e.g., /str/) and many more 2-member (e.g., /sp/) onset consonant clusters than does Spanish, which allows a smaller set of only 2-member onset clusters (e.g., /fl/). These differing phonotactic restrictions, or differences in structural complexity, between English and Spanish could be constructs that interact between the two languages of bilingual children because those constructs conflict with one another. Presence of more and greater complex structure in one language could possibly speed acquisition of related structure in the other language, providing evidence of acceleration in bilingual phonological acquisition.

Acknowledgments

We would like to thank the children and families who participated in this study. In addition, we thank Sonja Pruitt-Lord for her comments on an earlier version of the manuscript.

References

Acevedo MA. Development of Spanish consonants in preschool children. Journal of Childhood Communication Disorders. 1993; 15:9–15.

Bedore, L. The acquisition of Spanish. In: Taylor, O.; Leonard, L., editors. Language Acquisition Across North America. 1999. p. 157-207.

Chela-Flores G. Conservative and radical dialects in American Spanish: New Venezuelan data and theoretical implications. Opción. 2000; 16(33):34–48.

De Houwer, A. Bilingual language acquisition. In: Fletcher, P.; MacWhinney, B., editors. The Handbook of Child Language. Malden, MA: Blackwell Publishing; 1995. p. 219-250.

De La Fuente, MT. Unpublished doctoral dissertation. Georgetown University; Washington, D.C.: 1985. The order of acquisition of consonant phonemes by monolingual Spanish-speaking children between the ages of 2;0 and 6;5.

Díaz-Campos, M. Becoming a member of the speech community: Learning socio phonetic variation in child language. In: Díaz-Campos, M., editor. The Handbook of Hispanic Sociolinguistics. Wiley-Blackwell; Malden: MA: 2011.

Dubois S, Noetzel S. The intergenerational pattern of interference and internally motivated changes in Cajun French. Bilingualism, Language, and Cognition. 2005; 8(2):131–143.

Fabiano L, Goldstein B. Phonological transfer in bilingual Spanish-English speaking children. Journal of Multilingual Communication Disorders. 2005; 3(1):56–63.

Fabiano-Smith L, Barlow J. Interaction in bilingual phonological acquisition: Evidence from phonetic inventories. International Journal of Bilingual Education and Bilingualism. 2010; 31(1):1–17.

Fabiano-Smith L, Goldstein B. Early, middle, and late developing sounds in monolingual and bilingual children: An exploratory study. American Journal of Speech-Language Pathology. 2010a; 19:1–12. [PubMed: 20139352]

Fabiano-Smith L, Goldstein B. Phonological acquisition in bilingual Spanish-English speaking children. Journal of Speech, Language, and Hearing Research. 2010b; 53:1–19.

Gawlitzek-Maiwald I, Tracy R. Bilingual bootstrapping. Linguistics. 1996; 34(5):901–926.

Goldstein B. Transcription of Spanish and Spanish-influenced English. Communication Disorders Quarterly. 2001; 23(1):54–60.

Goldstein B. Substitution patterns in the phonology of Spanish-speaking children. Journal of Multilingual Communication Disorders. 2005; 3(3):153–168.

Goldstein B, Cintrón P. An investigation of phonological skills in Puerto Rican Spanish-speaking 2-year-olds. Clinical Linguistics & Phonetics. 2001; 15(5):343–361.

Goldstein B, Bunta F, Lange J, Rodriguez J, Burrows L. The effects of measures of language experience and language ability on segmental accuracy in bilingual children. American Journal of Speech-Language Pathology. 2010; 19:238–247. [PubMed: 20484707]

Goldstein B, Fabiano L, Iglesias A. Spontaneous and imitated productions in Spanish-speaking children. Language, Speech, and Hearing Services in Schools. 2004; 35:5–15.

Goldstein B, Fabiano L, Washington PS. Phonological skills in predominantly English-speaking, predominantly Spanish-speaking, and Spanish-English bilingual children. Language, Speech, and Hearing Services in Schools. 2005; 36:201–218.

Goldstein B, Washington PS. An initial investigation of phonological patterns in typically-developing 4-year-old Spanish-English bilingual children. Language, Speech, and Hearing Services in Schools. 2001; 32:153–164.

Gretch H, Dodd B. Phonological acquisition in Malta: A bilingual language learning context. International Journal of Bilingualism. 2008; 12(3):155–171.

Guitart, J. Variability, multilectalism, and the organization of phonology in Caribbean Spanish dialects. In: Martínez-Gil, F.; Morales-Front, A., editors. Issues in the Phonology and Morphology of the Major Iberian Languages. Georgetown, Washington, D.C.: Georgetown University Press; 1997.

Gutiérrez-Clellen V, Kreiter J. Understanding child bilingual acquisition using parent and teacher reports. Applied Psycholinguistics. 2003; 24:267–288.

Gutierrez-Clellen V, Restrepo MA, Simon-Cereijido G. Evaluating discriminant accuracy of a grammatical measure with Spanish-speaking children. Journal of Speech, Language, and Hearing Research. 2006; 49:1209–1223.

Jakobson, R. Child language, aphasia, and phonological universals. Keiler, A., translator. The Hague; Mouton: 1968.

Keshavarz M, Ingram D. The early phonological development of a Farsi English bilingual child. International Journal of Bilingualism. 2002; 6:255–269.

Kessler B, Treiman R. Syllable structure and the distribution of phonemes in English syllables. Journal of Memory and Language. 1997; 37(3):295–311.

Labov, W. Unpublished thesis. Columbia University; University Microfilms: Ann Arbor, MI: 1964. The social stratification of English in New York City.

Labov, W. The three dialects of English. In: Labov, W., editor. New Ways of Analyzing Sound Change. Academic Press; New York, NY: 1991.

Law NCW, So LKH. The relationship of phonological development and language dominance in bilingual Cantonese-Putonghua children. International Journal of Bilingualism. 2006; 10(4):405–428.

Lipski, J. The linguistic situation of Central Americas. In: McKay, S.; Wong, SC., editors. New Immigrants in the United States: Readings for Second Language Educators. Cambridge University Press; United Kingdom: 2000.

Lleó C. The acquisition of prosodic word structures in Spanish by monolingual and Spanish-German bilingual children. Language and Speech. 2006; 49(2):205–229. [PubMed: 17037122]

Lleó C, Kehoe M. On the interaction of phonological systems in child bilingual acquisition. International Journal of Bilingualism. 2002; 6:233–237.

Lleó, C.; Kuchenbrandt, I.; Kehoe, M.; Trujillo, C. Syllable final consonants in Spanish and German monolingual and bilingual acquisition. In: Müller, N., editor. (In)vulnerable Domains in Multilingualism. Amsterdam, Philadelphia: John Benjamins; 2003. p. 191-220.

Maddieson, I. Patterns of Sounds. Cambridge, England: Cambridge University Press; 1984.

Mann HB, Whitney DR. On a test of whether one of two random variables is stochastically larger than the other. Annals of Mathematical Statistics. 1947; 18(1)

Meisel, J. Early differentiation of languages in bilingual children. In: Hyltenstam, K.; Obler, L., editors. Bilingualism Across the Lifespan: Aspects of Acquisition, Maturity, and Loss. Cambridge: Cambridge University Press; 1989. p. 13-40.

Oetting J, McDonald J. Non-mainstream dialect use and Specific Language Impairment. Journal of Speech, Language, and Hearing Research. 2001; 44:207–223.

Oetting JB, McDonald JL. Methods for characterizing participants' non-mainstream dialect use in child language research. Journal of Speech, Language, and Hearing Research. 2002; 45:505–518.

Oetting JB, Pruitt S. Southern African-American English use across groups. Journal of Multilingual Communication Disorders. 2005; 3(2):136–144.

Oller, D.; Delgado, R. Logical international phonetics program(LIPP). Miami: Intelligent Hearing Systems; 2000.

Paradis J. Do bilingual two-year-olds have separate phonological systems? International Journal of Bilingualism. 2001; 5:19–38.

Paradis J, Genesee F. Syntactic acquisition in bilingual children: Autonomous or interdependent? Studies in Second Language Acquisition. 1996; 18:1–25.

Payne, A. Unpublished doctoral thesis. University of Pennsylvania; 1976. The acquisition of the phonological system of a second dialect.

Payne, A. Factors controlling the acquisition of the Philadelphia dialect by out-of-state children. In: Labov, W., editor. Locating Language in Time and Space. Academic Press; New York, NY: 1980.

Pearson B, Fernandez S, Lewedeg V, Oller DK. The relation of input factors to lexical learning by bilingual infants. Applied Psycholinguistics. 1997; 18:41–58.

Peña E, Gutiérrez-Clellen V, Iglesias A, Goldstein B, Bedore L. The Bilingual English-Spanish Assessment. in development.

Peña ED, Bedore L, Rapazzo C. Comparison of Spanish, English, and bilingual children's performance across semantic tasks. Language, Speech, and Hearing Services in Schools. 2003; 34:5–16.

Peña ED, Bedore LM, Zlatic-Giunta R. Category-generation performance of bilingual children: The influence of condition, category, and language. Journal of Speech, Language, and Hearing Research. 2002; 45:938–947.

Poplack S. Dialect acquisition among Puerto Rican bilinguals. Language in Society. 1978; 7(1):89–103.

Rojas, R.; Bunta, F.; Iglesias, I.; Goldstein, B. Seminar presented at the convention of the American Speech-Language-Hearing Association (ASHA). Boston, MA: 2007 Nov. Interlocutor differential effects on ELL children's language output measures.

Stanford JN. Child dialect acquisition: New perspectives on parent/peer influence. Journal of Sociolinguistics. 2008; 12(95):567–596.

Stoel-Gammon, C.; Dunn, C. Normal and Disordered Phonology in Children. Pro-Ed; Austin, TX; 1985.

Schnitzer M, Krasinski E. The development of segmental phonological production in a bilingual child. Journal of Child Language. 1994; 21:585–622. [PubMed: 7852474]

Tse S, Ingram D. The influence of dialectal variation on phonological acquisition: a case study on the acquisition of Cantonese. Journal of Child Language. 1987; 14(2):281–294. [PubMed: 3611243]

United States Census Bureau. State and County Quick Facts. Philadelphia County, Pennsylvania: 2010. http://quickfacts.census.gov/qfd/states/42/42101.html

Vihman M. Getting started without a system: From phonetics to phonology in bilingual development. International Journal of Bilingualism. 2002; 6(3):239–254.

Weinreich, U.; Labov, W.; Herzog, M. Directions in Historical Linguistics: A Symposium. University of Texas Press; Austin, TX: 1968. Empirical foundations for a theory of language change.

Zamora, JC.; Guitart, JM. Dialectología Hispanoamericana. 2a. Ediciones Almar; Salamanca, España: 1998.

Zentella, AC. Growing Up Bilingual. Blackwell Publishers; Malden, MA: 1997.

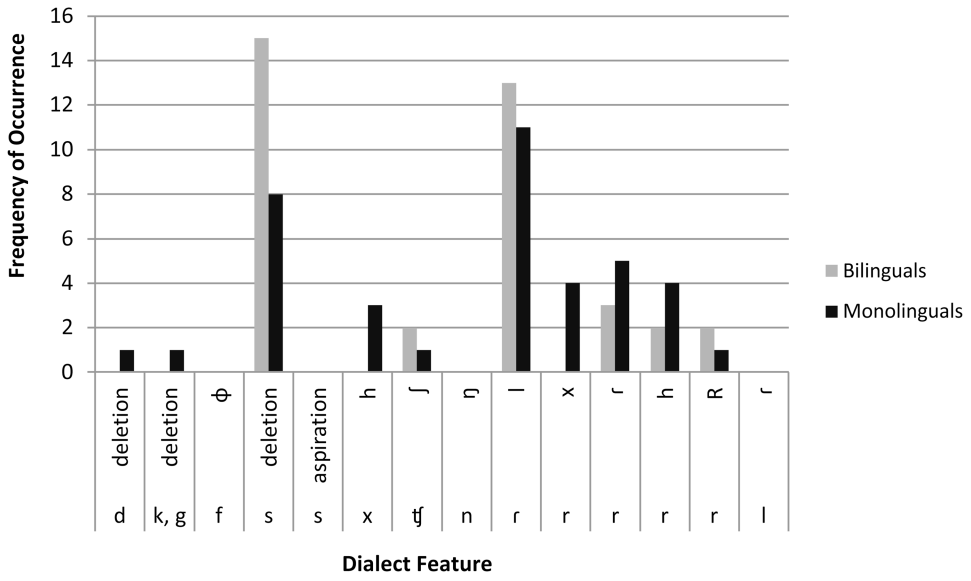

Figure 1.

Frequency of occurrence of dialect features for monolingual Puerto Rican Spanish-speaking children and bilingual Puerto Rican Spanish-English speaking children.

Table 1

Demographic characteristics of participants.

Subject	CA	Sex	Language Status	Language History	Spanish Proficiency*	English Proficiency*	% Input Spanish	% Output Spanish	% Input English	% Output English
B1	6;2	Female	Bilingual	Simultaneous	3	4	50	37.5	50	62.5
B2	6;2	Male	Bilingual	Simultaneous	3	4	50	50	50	50
B3	6;6	Female	Bilingual	Sequential	4	4	58.55	58.55	41.45	41.45
B4	6;1 0	Female	Bilingual	Sequential	3	3	34.38	34.38	65.63	65.63
B5	6;1 0	Male	Bilingual	Simultaneous	3	4	50	37.5	50	62.5
B6	7;0	Male	Bilingual	Sequential	3	3	75	25	50	50
S1	5;2	Male	Spanish	Spanish only	4	1	100	89.58	0	10.42
S2	5;3	Female	Spanish	Some English	4	1	100	93.75	0	6.25
S3	5;5	Male	Spanish	Some English	4	2	91.86	91.86	8.14	8.14
S4	6;0	Male	Spanish	Spanish only	4	4**	97.92	93.75	2.08	6.25
S5	7;1	Male	Spanish	Spanish only	4	1	50	92.86	50	7.14
S6	5;6	Female	Spanish	Spanish only	4	1	100	100	0	0

*A score of 0 represents that a child cannot speak the language at all and a score of 4 represents that a child has native-like proficiency in the language (Peña, Bedore, & Rapazzo, 2003; Peña, Bedore, & Zlatic-Giunta, 2002).

**Parental report of language proficiency does not match with other language ability measures in English and is treated as an inaccurate report.

Table 2

Dialect features of Puerto Rican Spanish from Goldstein (2001).

Phoneme	Modification	Example
/d/	deletion	/deð̞o/ → [deo]
/k, g/	deletion	/actual/ → [atual]
/f/	[ɸ]	/emfɾmo/ → [emɸɾmo]
/s/	deletion	/dos/ → [do]
/x/	[h]	/xamon/→ [hamon]
/ʧ/	[ʃ]	/muʧo/ →[muʃo]
/n/	[ŋ]	/xamon/ → [hamoŋ]
/ɾ/	[l]	/maɾtijo/ → [maltijo]
/r/	[ɾ], [x]	/pero/ → [pexo]
/l/	[ɾ]	/asul/ → [asuɾ]

Table 3

Dialect density of Puerto Rican Spanish in monolingual Puerto Rican Spanish-speaking children and bilingual Puerto Rican Spanish-English speaking children.

	Monolingual Spanish-Speakers	Bilingual Speakers
Mean	.19	.22
SD	.13	.07
Range	.07 - .39	.10 - .32
Outliers	none	none