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**A LONGITUDINAL INVESTIGATION OF A SEQUENTIAL ARABIC-ENGLISH
BILINGUAL CHILD'S VOCABULARY DEVELOPMENT**

A Masters Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts, English

By

Seba Al-hindawy

May 2016

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A LONGITUDINAL INVESTIGATION OF A SEQUENTIAL ARABIC-ENGLISH BILINGUAL CHILD'S VOCABULARY DEVELOPMENT

English

Missouri State University, May 2016

Master of Arts

Seba Al-hindawy

ABSTRACT

The purpose of the study was to explore the lexical development of a sequential bilingual Arabic-English speaking child. The study contributes to the growing research literature on the language behaviors of early bilingual children and specifically to the discussion of bilingual developmental milestones. The child's vocabulary growth was assessed over the course of a year with the MacArthur-Bates Communicative Development Inventory (CDI-III, English and Arabic versions), the Peabody Picture Vocabulary Test (PPVT-4), parent interviews, and the Frog Story Narrative Test. Lexical measures were analyzed over time and indicated that the child progressed in the dominant language, English, similarly to the developmental trajectories of monolingual children, regardless of the bilingual exposure in the home. Both lexical and syntactic development halted in the native language after immersion in English. The findings suggest that balanced bilingualism is difficult to maintain even for sequential bilingual children, regardless of parents' linguistic skills, in the absence of a language community for the minority language.

KEYWORDS: bilingualism, vocabulary, lexical acquisition, child language acquisition, bilingual developmental milestones theory, lexical measures.

This abstract is approved as to form and content

Andrea B. Hellman, EdD
Chairperson, Advisory Committee
Missouri State University

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TABLE OF CONTENTS

Introduction.....	1
Review of the Literature	3
Childhood Bilingualism Definitions	3
Critical Issues about Bilingualism	4
Monolingual Versus Bilingual Language Development.....	6
Lexical Acquisition.....	8
The Measurements of Lexical Acquisition in Young Children.....	12
Longitudinal Case Studies of Bilingually Developing Children	13
Bilingual Development Milestones Theory	13
Methodology	16
Participants	16
Critical Questions.....	17
Research Goals	18
IRB Approval	18
The MacArthur-Bates Communicative Development Inventory (CDI-III).....	19
The Reliability of Parents as Assessors	20
Peabody Picture Vocabulary Test (PPVT-4): Background and Procedure.....	21
Frog Story Narrative Test: Background and Procedure.....	22
Parents' Interview	23
Data Analysis Methods	24
Child Language Data Exchange System.....	25
Results	26
English CDI	26
Arabic CDI	29
PPVT-4 Performance	31
The Overall Results of the Frog Story Tests	32
Parents' Interview	36
Discussion	38
References.....	45
Appendices	51
Appendix A. Human Subjects IRB Approval	51
Appendix B. Frog Story Data	52

LIST OF TABLES

Table 1. Measures of Lexical Variation.....	25
Table 2. English CDI Score Summary	28
Table 3. The Mean Length of Utterance (MLU) for the Longest English Sentences.	29
Table 4. Arabic CDI Score Summary.....	30
Table 5. The Inter-Rater Reliability of the Parents' CDIs.....	31
Table 6. PPVT-4 Score Summary	32
Table 7. Lexical Measures of Four Frog Stories.....	35
Table 8. Comparison Group Scores Summary.....	36

LIST OF FIGURES

Figure 1. The vocabulary growth expressed as the percentage of known words on the English CDI.....	27
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INTRODUCTION

Raising young children to become bilinguals is much more involved than one might expect. In fact, learning two languages in early childhood is beneficial for future success. Bilingual children are apt to recognize the two languages and are able to develop as well as monolinguals in each language (Genesee, 2015). The research reflects controversies regarding the outcomes of bilingual development with some research indicating disadvantages, such as delayed lexical development in early childhood and a smaller vocabulary size than that of monolingually-developing children. Studies that examined the developmental milestones of bilingually developing children found that bilingual children's linguistic growth follows the same developmental milestones, but not the same rate of development, as their monolingual peers (Petitto et al., 2001). The fact that the findings on bilingual development in early childhood are controversial and may even be disadvantageous for the child in some ways spurs the need for further research because parents and educators may draw the wrong conclusions based on inconclusive research findings.

A growing body of research has focused on the lexical development of young bilingual children. De Houwer (1990) examined longitudinally the language development of bilingual children. A study by Pearson, Fernandez, and Oller (1993) found that early vocabulary development in bilingual children was not shown to occur at a slower rate than in monolingual children. They suggested that in order to assess bilingual children's vocabulary development, vocabulary performance should be measured in both of the

child's languages. The number of studies in the recent literature that have compared the developmental milestones of bilinguals to monolinguals is still few. Thus, the primary purpose of this study was to explore the lexical development of a bilingual child by measuring the child's vocabulary growth and the vocabulary size in his two languages over time. The study also aimed to examine whether the child was developing along the same developmental milestones as a monolingual child.

The study involved one bilingual child who acquired the English and Arabic languages sequentially. The child's vocabulary growth was examined using multiple research methods (qualitative and quantitative) in order to gain a holistic view of his bilingual language development. This study contributes to research based on the child's language combination, the range of lexical measures, and the longitudinal investigation. The data of this paper were collected using the best methods collected from previously published research, employing widely used instruments in child language studies. As a result, the findings of this study may therefore be of benefit to the study of child language development.

REVIEW OF THE LITERATURE

Children usually acquire their first language (L1) naturally without parents' instruction, and they can learn another language with parents' help. Some parents are concerned about their children who are being raised bilingually. They think that learning two languages will affect their children's language development. Some parents fear that bilingualism may lead to language delays and cognitive weaknesses, while others are concerned that the child's mother language will be weaker as a result of learning a second language at an early age. A study by Bialystok and Herman (1999) showed that bilingualism does not affect the child's linguistic development, and any language development delay is impermanent. In this study, I review some of the critical issues that are related to how children are raised bilingually and how many language systems they possess. I also review a number of research studies on how a bilingual child develops over time in terms of lexical acquisition. I discuss the main theoretical perspectives of bilingual language development.

Childhood Bilingualism Definitions

The definition of bilingualism is surprisingly complex in light of the age at which two languages are acquired, the sequence of language acquisition, the sources of exposure to languages, and the proficiency achieved in each language. In studies on childhood bilingualism, a fundamental distinction is between simultaneous and sequential bilingualism. Simultaneous bilingualism occurs when the bilingual child acquires two

languages from birth to the age of one year, that is, from the pre-verbal stage of language development. In sequential bilingualism a child is exposed to the second language (L2) later in childhood. Sometimes, simultaneous and sequential bilingualism are referred to as early and late bilingualism (David, 2004). When a bilingual has low proficiency in either language, the term *semi-lingual* may be used. Each bilingual case is different in terms of the circumstances that are related to the acquisition of two languages, so the interpretation of the term is rather context specific and general assumptions should be avoided (David, 2004). The child in this study is best characterized as a sequential bilingual because he was exposed to the second language later in his childhood.

Critical Issues About Bilingualism

Researchers have had difficulties defining bilingualism and they have debated about who can be considered a bilingual. Li (2000) defined a bilingual person as someone who possesses two languages. In relation to this issue, an important debate is the one versus two language systems, a topic that has been the concern of many authors (Volterra & Taeschner, 1978; De Houwer, 1990; Deuchar & Quay, 2000). This debate has two hypotheses: the unitary system and the separate systems hypotheses. The two hypotheses relied on unresolved issues related to bilingual language acquisition. The unitary system hypothesis argues that bilingual children develop a single language system that accommodates both languages simultaneously; children themselves are unaware that they speak two different languages until after they are at least three years old. The major principle of the unitary debate is that having one language is the default system.

However, for the acquisition of more than one language, the child's brain must go through a number of important changes. Bilingual children are initially monolinguals with undifferentiated syntactic, lexical, and phonological systems. Volterra and Taeschner (1978) discussed the linguistic stages that bilingual children go through and the strategies that have been employed especially by simultaneous bilingual children through the learning stages. Volterra and Taeschner (1978) formulated the one system hypothesis, and they divided learning into three stages: the first is that the lexical system of simultaneous children is hybrid in the sense that the child is unable to separate between the lexical systems of the two languages. In other words, there are no L1-L2 equivalents in the child's lexicon. Later, the lexical systems of the child's two languages start to separate slowly; the child starts to have cross-linguistic synonyms but s/he employs the same syntactic rules for the two languages. The third stage is related to the child's vocabulary and syntax; the two languages are eventually sorted into a differentiated but unified system. Around the age of two years and nine months (2;9), children enter this stage and can be finally considered to be true bilinguals. Although the unitary hypothesis is still criticized, it is one of the most important theories of bilingual language development up to the present.

The second main position in this debate is the separate systems hypothesis, which claims that bilingual children have a separate system for each language from the earliest stages of language development (David, 2004). The two systems hypothesis, unlike the unitary system hypothesis, posited that bilingual children have no monolingual setting; rather, they begin as bilinguals. In their study, Genesee, Nicoladis and Paradis (1995)

observed five French-English bilingual children. The parents spoke different languages. The children's age was between 22 and 26 months and they were at the two-word stage. The researchers concluded that the children could differentiate between the two languages and were capable of using them properly.

To sum up, both hypotheses have evidence to support their claims. The separate systems hypothesis seems to still attract new research studies, like the study of Deuchar & Quay (2000), who produced evidence against the claim that bilingual children are unable to provide linguistic synonyms. The next section presents a discussion about how bilingual development is different from monolingual development.

Monolingual Versus Bilingual Language Development

While literature has mainly focused on the language system debates, another important debate has been the difference between monolingual and bilingual children in terms of their language development. A common belief is that monolingualism is the norm and bilingualism may lead to linguistic and cognitive confusion. Umbel, Pearson, Fernandez and Oller (1992) found that bilingual children who took the Peabody Picture Vocabulary Test (PPVT) lagged behind their monolingual age mates in vocabulary knowledge. However, when Pearson, Zurer, Fernandez, and Oller (1993) compared bilinguals' and monolinguals' cognitive abilities, they concluded that bilingual children have greater creative thinking and better linguistic abilities than monolinguals.

In a major study (De Houwer, 1990), it was found that both monolinguals and bilinguals' morphosyntactic development happens at the same age. De Houwer

concluded that both bilingual and monolingual children share the same primary process of language development. A common belief is that bilingual children are late in terms of language development because they learn two languages instead of one; consequently, the learning time is longer than the time monolinguals need. Oller, Eilers, Urbano, and Cobo-Lewis (1997) described the belief that bilingual children are weaker than monolingual as the deficit bilingualism hypothesis. This means that bilingual children have to divide their cognitive abilities between the two languages, so there will be limited resources in each language. Recent studies also investigated the similarities between bilingual and monolingual children in terms of morphosyntactic language acquisition (David, 2004). De Houwer (1990) examined a bilingual girl, Kate, who acquired Dutch and English simultaneously. Kate resembled her monolingual peers. Kate used the structures of both languages, such as interrogative structures, complex and compound sentences, and tag questions, in the same way as a monolingual child did. Moreover, more evidence is available in Paradis and Genesee's (1996) study. Their results showed that bilingual children who acquire English and French follow the same acquisition patterns, like the use of pronouns, as their monolingual speakers who are learning either English or French. Other studies (for example, Pearson, Fernandez and Oller, 1993) presented similar findings that bilingual children are similar to their monolingual age mates in terms of their linguistic development, such as the use of finite verbs. Khattab (2002) discovered that bilingual Arabic-English children acquire the same phonological patterns for both languages, but they are not the same patterns that a monolingual acquires. As for vocabulary size, there is evidence of differences between bilinguals and

monolinguals. Poulin-Dubois, Bialystok, Blaye, Polonia, and Yott (2013) compared the productive vocabulary size of bilingual and monolingual children using the Communicative Development Inventory (CDI) measurement over time. They found that the lexical size of monolingual children was larger than that of bilingual children. To sum up the issue of the similarities between bilinguals' and monolinguals' language development, evidence shows that both monolinguals and bilinguals are similar in some language aspects and different in other aspects. Although bilingual development demonstrates similar language patterns to monolinguals, the similarities do not mean that a bilingual child's two languages have the same development rate. Considered together, the evidence is far from conclusive regarding the nature, rate, and eventual outcome of bilingual language development.

Lexical Acquisition

Children differ in their language and speech development in terms of the pace of their language development timeline, but they master language skills by following a natural and predictable progression. The typically developing child's language acquisition starts very early in life, long before s/he speaks the first word. Very early language skills include recognizing the mother's voice, identifying the mother's native language through its phonology, segmenting the speech flow into smaller units, categorizing speech sounds by the features of the native language, participating in turn taking in conversation by cooing and smiling on cue (Gleason & Ratner, 2009). The milestones of language development become gradually more salient when the child enters

the babbling stage at the age of 7-10 months (Petitto & Marentette, 1991), says the first words around age one, produces two words combinations at the age of 1;6, and speaks 50 words at the age 1;7 (Petitto et al., 2001). Ganger and Brent (2004) state that when the child reaches the age of two years, s/he produces 30 to 300 new words. Verhallen and Schoonen (1998) observe how children in general acquire new vocabulary and new concepts. Conceptual development has an important role impacting vocabulary growth in children's second language learning (Cameron, 2002). The types of words that children learn change as a function of linguistic and cognitive development. The types of words that children acquire are common nouns like objects' names as well as verbs such as *eat* (Hoff, 2006). The vocabulary types that the child acquires differ according to several factors, for instance; the language, the culture, maternal style (Hoff, 2006). Pearson, Fernandez and Oller (1995) mention the fact that the size of a child's vocabulary and the capacity of lexical production are related to his/her intelligence scores and school success. Those authors compare younger and older bilingual preschool children, and they conclude that five year-old children outperform three-year-old children in both kinds of vocabulary: receptive and productive. Receptive vocabulary refers to all words that the child can understand, and productive vocabulary are all words that the child can speak and write (Ypsilanti, Grouios, Alevriadou, & Tsapkini, 2005). The production of early words is one of the most important matters concerning the lexical acquisition of monolinguals.

David (2004) pointed to many factors that may affect the child's lexical acquisition, such as siblings, birth order, the amount of exposure to language input,

socioeconomic background, and language attitude. David particularly emphasized the importance of parents' role in balancing the amount of input for the two languages.

Turian and Altenberg (1991) also highlighted the issue of balancing the exposure amount that a bilingual child has to each language; they reported the case of the first author's son, Joseph, who acquired Russian and English. When Joseph was age 3;6, the amount of the Russian language exposure was decreased and the child lost some language aspects like vocabulary items.

Several methods were used to investigate children lexical acquisition. Some recent researchers, like Deuchar and Quay (2000), who kept diaries about their children that had rich lexical details. Deuchar and Quay examined Deuchar's daughter, who acquired English and Spanish simultaneously, and they examined the diary the parents kept about the child. They found that by the age of 2;0, her lexical items were 53 percent in English, and she had translation equivalents in her lexicon. Pearson, Fernandez and Oller (1993) investigated bilingual lexical acquisition using different instruments, like parental reports, in order to assess the children's lexical development. They argued that monolingual children are not faster than bilingual children in vocabulary development. They provided evidence against the existence of translation equivalents. Pearson, Fernandez and Oller (1993) concluded that bilinguals had the same total number of lexical items as monolinguals. In addition, they also investigated the connection between bilingual language exposure and children's vocabulary size. Based on previous research, Pearson (1998) reviewed the issue of bilingual lexical acquisition as compared to monolingual lexical acquisition. She suggested that the lexicon of a bilingual child

consists of three different lexicons. For example, in the case of an English-French speaking child, s/he would have an English lexicon, a French lexicon, and a third lexicon, which consists of a mix of items found in the two languages. Pearson also proposed many ways to measure bilingual vocabulary, such as total conceptual vocabulary (TCV). Pearson mentioned that the TCV is a useful method used to count the lexical items among the child's three lexicons and to overcome the overlaps that happened among the lexicons. In summary, the child's lexical development was assessed by using different and useful ways in order to examine the child's lexical knowledge.

Another important vocabulary phenomenon researchers have been investigating is the vocabulary spurt (Ganger & Brent, 2004). When the child reaches the point when s/he can understand 50 words but does not produce them, vocabulary growth begins to rapidly accelerate (Ganger & Brent 2004). The growth can become exponential and the earlier it occurs the more dramatic the outcome in terms of vocabulary growth. The vocabulary spurt occurs between the time when the child starts producing more than one word and before s/he produces sentences. Because not all children experience a dramatic acceleration, researchers continue to debate the universal existence of the phenomenon.

In this section, I have covered a number of important issues related to the milestones of vocabulary development. The vocabulary spurt is also discussed here, which is a significant change in the child's linguistic and cognitive development. This sudden change happens while the child is in the process of acquiring new vocabulary.

The Measurements of Lexical Acquisition in Young Children

Several validated measures exist to gauge young children's vocabulary development. The Peabody Picture Vocabulary Test (PPVT) is one of the most common standardized tests used to measure receptive vocabulary. The newest version is the PPVT-4, which was normed on a variety of populations from pre-school to adults. It is published by Pearson and has a score interpretation manual (Dunn & Dunn, 2007).

Parental reports are a common tool in the research literature on early vocabulary development. The most widely used standardized parental report instrument on vocabulary knowledge is the MacArthur-Bates Communicative Development Inventories (CDI), which is suitable for both bilingually and monolingually developing children. The MacArthur-Bates CDI has two forms: long and short. The choice of using either one depends on the clinical or research purpose. Three versions of the CDI are available: CDI Words and Gestures, which can be used with children from 8–18 months, CDI Words and Sentences, which fits children of 16–30 months, and the CDI-III, which measures language in children ages 30-37 months. These measures enable researchers to tap into the knowledge of the parents about their children's communicative development (Fenson et al., 2007).

Another measure also widely used in the literature is the frog story narrative. It is a wordless picture book by Mercer Mayer entitled *Frog, Where Are You?* A collection of 600 child narratives of this book is available in the Child Language Data Exchange System (CHILDES) database. The frog story narration can be transcribed and coded by using Codes for Human Analysis of Transcripts (CHAT) format (MacWhinney, 2015),

and the Computerized Language Analysis Program (CLAN) (MacWhinney, 2015).

Longitudinal Case Studies of Bilingually Developing Children

According to David (2004), a longitudinal study in child language research typically refers to parental diary studies and studies that involve visiting with a focus child periodically in order to collect language samples. Longitudinal studies allow the researcher to collect large language samples from focus children over time. The current study is a longitudinal case study, which involved collecting rich data on a bilingual child's vocabulary growth by several established measures. A great number of studies have been conducted in this way, such as De Houwer (1990), whose case study involved a child acquiring both English and Dutch starting at the age of 2;7. De Houwer (1990) collected 19 hours of recordings over eight months. Goldfield and Reznick (1990) also examined the gradual word learning of 19 bilingual children; they used the diary method as well as phone recordings for their data. Genesee, Nicoladis and Paradis (1995) also investigated bilingual language acquisition longitudinally; their study involved examining children of different ages. By far, parental diary studies are the most common form of longitudinal studies. Longitudinal studies as a data collecting method have many benefits, such as allowing the researcher to document the child's growth over time.

Bilingual Development Milestones Theory

The bilingual developmental milestones theory claims that bilingual children develop with the same developmental milestones as monolinguals. A number of studies

have provided evidence showing that bilinguals can be compared to their monolingual peers in terms of the developmental milestones, including the production of one word, first two words, and 50-word vocabulary stages. Petitto, Katerelos, Levy, Gauna, Têtreault, and Ferraro (2001) empirically examined the developmental milestones of a number of bilingual children. The authors reported that the children reached the same developmental milestones in each language as well as the same as monolinguals. Evidence is also shown in the study of Oller, Filers, Urbano, and Cobo-Lewis (1997), who found that infants who grew up in bilingual and monolingual settings started the canonical babbling stage at the same age. Pearson and Fernandez (1994) also found that both bilinguals and monolinguals follow the same lexical growth timetable and patterns. The current study is based on the theory of bilingual development milestones in order to examine whether the child developed with the same developmental milestones as his monolingual peers.

This chapter has reviewed the literature that is mostly concerned with the debate of whether a bilingual child has one or two language systems. Previous research discussed how a bilingual child acquires two languages and how the child's brain is able to control two languages. Yet it should be indicated that until now little research has examined the way sequential bilingual children develop over time in terms of lexical development and how bilingual development is different from monolingual development in terms of milestones. Therefore, this study is an attempt to fill the earlier gaps by examining the child's receptive and productive vocabulary and the growth in his two languages over time.

METHODOLOGY

This chapter discusses the methodological approach and presents the research design that is suited to investigate the research questions. The most appropriate methods are proposed in order to answer the questions of this paper. This chapter provides first an overview of the sample selection, followed by the research questions, the data collection instruments, and procedures.

Participants

The participant of this study is Kinan, a healthy, normally developing boy, who came from his home country, Iraq, to reside in the United States at the exact age of two years and eight months. He is a sequential bilingual Arabic-English speaker, who is acquiring English in an immersion setting in preschool. He began to attend a childcare program in a Midwestern town within one month of his arrival to the U.S. He spent four days a week, five hours per day at the childcare. Soon after, he started saying a number of English words. Outside the childcare, he produced a number of unintelligible words. He was only repeating the words he learned in the childcare. Kinan left the childcare program after nine months. At three years and eleven months, he started in a preschool program. He spent eight months there, five days a week, three hours per day. He adjusted to the English speaking environment and socialized easily; he seemed to have no emotional barriers when communicating with English speakers. In fact, within two months of his arrival, he started talking only in English. At the start of the study, Kinan

was starting his second year at the preschool at the age of 5;3. Kinan's parents are native speakers of Iraqi Arabic, who speak English fluently. When they were in Iraq, they only talked to Kinan in Arabic, but when they moved to the United States, they started talking in both languages, Arabic and English, inside and outside of the home. The amount of exposure to both languages was not equal because Kinan's parents were speaking English more than Arabic. Their stated intent was to let him learn both languages equally and they expected to establish a balance between the two. Kinan was spending most of his time in school, and he recently started taking Arabic classes in his school once a week. His age at the conclusion of the study was 6;3.

The purpose of choosing the participant was because the child is a healthily developing sequential bilingual of Arabic and English, who began acquiring his second language at the age of 2;8 at the time when his Arabic vocabulary growth rate was very high, and became immersed in English through preschool, adjusting to the English speaking environment rapidly and socializing easily.

Critical Questions

The present study is best placed in the bilingual development milestones theory, which states that bilingual children develop linguistically at the same rate as monolinguals (Petitto et al., 2001). The study investigated whether the bilingually developing child is following the same language milestones as expected from monolingual children. Numerous research studies in the literature provided evidence that was compatible with the theory. This study might add further evidence to support this

theory. I am therefore interested in pursuing answers to the following questions:

1. Does the bilingual focus child develop with the same developmental milestones as monolingual children?
2. Does the bilingual focus child's vocabulary develop at the same rate (speed) as the vocabulary of monolingual children?
3. Does Kinan acquire the two languages simultaneously or sequentially?
4. Does Kinan present as a balanced or a dominant bilingual child?

Research Goals

The main goal of this study was to investigate the lexical acquisition of a sequential bilingual Arabic-English speaking child. This study examined the growth of vocabulary over time in the child's two languages using several vocabulary measures and widely used instruments from previous child language studies. The present study is intended to investigate the following points: (1) the child's lexical development over time by measuring the receptive and productive vocabulary; (2) the growth of vocabulary size in the child's two languages (Arabic and English) over time.

IRB Approval

The researcher completed the Collaborative Institutional Training Initiative (CITI) including the Humanities Responsible Conduct of Research and the Social Behavioral Research certificates. The researcher obtained the Missouri State University Institutional Review Board (IRB) approval for the purpose of collecting data and analyzing language samples and to assess lexical development (#15-0471, May 5th, 2015, Appendix A).

The MacArthur-Bates Communicative Development Inventory (CDI-III)

This study was a longitudinal case study that employed a variety of data collection instruments that allowed for both qualitative and quantitative examination of the child's language development in both of his languages, English and Arabic. The MacArthur-Bates Communicative Development Inventory (CDI) is one of the most useful parental report methods to assess children's vocabulary. Although children's language development can be studied by laboratory methods, parental reports are preferable; they tend to yield more reliable measures because individual children vary in how they adjust to and perform in laboratory settings. Parental reports can be analyzed easily by any researcher. Another benefit is that this tool only takes a short time to administer (David, 2004). Since this study is a longitudinal case study, this method is very beneficial for obtaining repeated measures without exhausting either the parents or the child. This paper employed the CDI-III, which is composed of a two-page questionnaire designed to assess the vocabulary of preschool-age children as reported by a caregiver as well as to assess the child's overall language abilities and development. It includes a one-page vocabulary list, sentence pairs, and yes/no questions. The instrument was normed and published; it has a manual (Fenson et al., 2007). It takes 20-40 minutes for a parent to complete. The instrument has both English and Arabic versions. The Arabic version was created by the Jeddah Institute for Speech & Hearing in Saudi Arabia and is composed of two forms: one is to measure gestures and words, and the second is to measure words and sentences.

The child's parents were asked to sign a consent form in order to participate in the

study. Then, a copy of the CDI-III was given to the parents; I explained to them how to answer the two-page questionnaire by following the same procedure as described in the user's manual (Fenson et al., 2007). On the first page, the parents filled out a vocabulary checklist, which consisted of 100 words; they marked the words that the child produced even if the pronunciation was a little bit different. Next, on the same page, the parents were asked if the child had started to combine words. If so, they had an additional part to complete. They had to check one of the three responses given: "Not yet," "Sometimes," and "Often." On the second page, the parents answered a number of questions. First, they were asked to indicate whether the child produced complex sentences. Then, they responded to twelve yes/no questions about the child's language use. Finally, they were prompted to record the three longest sentences that the child had produced recently.

To summarize, the CDI is one of the best tools used in children's studies in order to examine vocabulary (Robertson, 1999). The CDI was selected among other parental reports since it is the only commonly used checklist that has versions in other languages. It is used for several purposes such as measuring the total vocabulary and assessing syntactic development (Fenson et al., 2007).

The Reliability of Parents as Assessors

The child's parents participated in this study and completed the CDI-III forms in the child's second language (English). De Houwer and Bornstein (2001) found that both parents are able to assess their children. Other studies in the literature found that mothers tended to rate their children higher than fathers did (David, 2004). In addition, David

(2004) found that parents tended to assess the abilities of their children in their native language higher than in their non-native language; consequently, the rating scores between the two languages differ.

The parents were asked to fill out the CDI-III forms once every three months. They received the second and subsequent forms only after returning the previous form. This was done to prevent the parents from copying the vocabulary words from one sheet to another. This allowed the researcher to check for the development over time, and this also showed how reliable the parental reports were. Overall, the CDI illustrates what the parents think the child already knows at a certain age.

Peabody Picture Vocabulary Test (PPVT-4): Background and Procedure

This instrument was designed to measure receptive vocabulary size in English. Test administrator presents target words, one at a time, and four illustrations for each word, only one of which is the correct representation of the target word; in other words this instrument is a visual multiple choice test. Items start with simple words and actions and gradually become more difficult. The PPVT-4 is the fourth generation of this instrument, which has been widely employed in educational as well as clinical settings. The instrument is published by Pearson and has a score interpretation manual; it takes 15 minutes to complete. PPVT-4 is a colorized edition, which is composed of two forms (A and B). Each form involves trial items and 228 testing items.

This study examined the child's receptive vocabulary size in the English language. This test was administered to the child three times over six months. It was

intended to measure the child's vocabulary growth over time, but the first two times I administered the test, I did not complete the entire test due to a technical mistake. The last administration was carried out correctly. I examined the child in a quiet room. Each test took 15 minutes to complete. The child was presented with ten sets, each set composed of twelve items for a total of 120 items.

The PPVT-4 instrument reports scores in various ways: normative and non-normative. The normative scores consisted of two kinds: standard scores and developmental scores. The standard scores provide stanines, and normal curve equivalents. These scores indicate how the child's results compare to other children's scores, who are in the same grade or the same age. According to the scale of the PPVT-4, a standard score of 100 is the average score for a child's grade or age.

Frog Story Narrative Test: Background and Procedure

The frog story test is based on a wordless picture book which is entitled *Frog, Where Are You?* (Mayer, 2003). A collection of 600 child narratives of this book is available in the CHILDES database. The child narrated the wordless pictures of the book while I recorded his narration in only the English language. I transcribed the frog story in Codes for Human Analysis of Transcripts (CHAT) format (MacWhinney, 2015), which allows computerized analysis of transcripts with the Computerized Language Analysis Program (CLAN) (MacWhinney, 2015). The CHAT and CLAN are discussed further in the next section. This method makes it possible to take measures on transcripts and compare them across participants, as well as longitudinally on the transcripts of the same

participant. The frog story narrative transcripts are located online at <http://childes.psy.cmu.edu/data/Frogs/>. The child's talk was recorded as an audio file and each recording of the child's story narration was transcribed and coded.

The coding process was done for all recordings of the child's story narration. The researcher followed the CHAT manual in order to code the child's talk. This manual highlighted the principles and the conventions of CHAT transcription. CHAT is the standard transcription system for the CHILDES database (MacWhinney, 2015). Transcription was different from coding; coding was to analyze and recognize the transcribed speech. The transcription process emphasized the written record production for the purpose of understanding the child's talk. The CHAT system provided a wide range of coding options.

After transcribing the three frog story recordings, the files were saved as CHAT files. Then, the CLAN program was used to get the frog story scores in detail. The CLAN computed the mean length of utterances (MLU), the number of word types (FREQ), and the lexical diversity (VOCD). The CLAN files were saved automatically to the TalkBank database (MacWhinney, 2015).

Parents' Interview

The child's parents were interviewed using the Skype program in order to verify Kinan's language development. The parents answered seven open-ended questions: (1) How much is the child exposed to both languages and to which language is he exposed the most? (2) How many household members are there? (3) Who are the people he

interacts with and what kinds of topics does he discuss? (4) Is the child exposed to the Arabic language outside the home? (5) What is the main source of his language development? (6) How does the child interact with other children each day? (7) How do the parents feel about their child's language development?

Data Analysis Methods

In this paper, a number of lexical measures were used in order to analyze the data; T1 summarizes those measures. The type token ratio and the D measure were calculated on the CHAT/CLAN transcripts by using the VOCD and FREQ programs; the Guiraud (Daller, Milton, & Treffers-Daller, 2007) was also calculated on the same data files, but this calculation had to be carried out separately because the CLAN program group does not have this measure built-in.

Another data measure was used in order to identify the advanced words. The Advanced Guiraud index (Daller, Milton, & Treffers-Daller, 2007) was used in this paper as a lexical sophistication measure, which is calculated as the ratio of the advanced types to the square root of total tokens. The sophisticated words were identified by using CLAN transcripts and Biemiller's wordlist (Biemiller, 2010). The last measure, lexical density (LD), was used to obtain the ratio of the function tokens to the total tokens; the lexical density was calculated manually using the output from the FREQ analysis on the CHAT transcripts.

Table 1. Measures of Lexical Variation

Measure	Symbol	Calculation
Guiraud	G	Types / $\sqrt{\text{Tokens}}$
Type Token Ratio	TTR	Types / Tokens
Lexical Diversity	D	Calculated by the VOCD program
Advanced Guiraud	Ag	Advanced types / $\sqrt{\text{Tokens}}$
Lexical Density	LD	Function tokens / Total tokens

Child Language Data Exchange System

The CHILDES system maintains searchable transcripts of child language data. This tool was used in this study in order to analyze the child’s speech. Appropriate levels of access were determined by the participants/legal guardians of child participants who are the source of the data. All transcripts had pseudonyms; participants always had the right to request that part or all of their data be removed from the database. A clear protocol exists for the contribution of data, including proper acknowledgements. In this research, only the transcripts and audio of the frog story narrative were contributed; the purpose of the contribution was to comply with ground rules, which request that the researcher of this paper who was utilizing the database make original contribution of child language samples in the form of transcripts and, when possible, linked audio files.

RESULTS

English CDI

The results of the English CDIs showed the growth of the child's vocabulary size. The parent's inventories indicated a remarkable increase in the number of the words produced by the child. The CDI reports were scored based on the normative scoring reported by Wooden (2004). In order to score the vocabulary checklist, the sentence complexity items, the language use items, for each section the number of the items were added to obtain the child's sub-scores. For the vocabulary checklist, the number of all items checked by the parent across each of the 100 words was added in order to calculate the child's total vocabulary production score. For the sentence complexity part, the number of the more complex sentences that the child produced was also counted. The next part of scoring was calculating the mean length of utterance for the longest three sentences the child produced. In order to calculate the child's MLU scores, I made a CHAT file for the child's three long sentences, which I analyzed with the CLAN MLU software.

The first English CDI at age 5;3 showed that the child produced 69 words (69%) out of a total 100 on the vocabulary checklist. Kinan also produced 12 complex sentences and had 11/12 (92%) positive scores on the language use items. The mean length of utterance score (MLU) was 5.75 ($SD = 1.79$). The results of the second English CDI at age 5;7 revealed that the child produced 79 (79%) words on the vocabulary checklist part, which was 10 more words than he had produced just four months earlier. The MLU score

rose to 8.80 within ($SD = 3.10$) as shown in T2. By the age of 6: 1, Kinan produced 95 (95%) words on the checklist, 16 more words on the checklist than four months before. The growth of his vocabulary as a function of the known words on the English CDI is illustrated in F1. The MLU score also increased to 11.75 within ($SD = 2.49$). The results of the sentence complexity and the language use items were the same as four months earlier (100%).

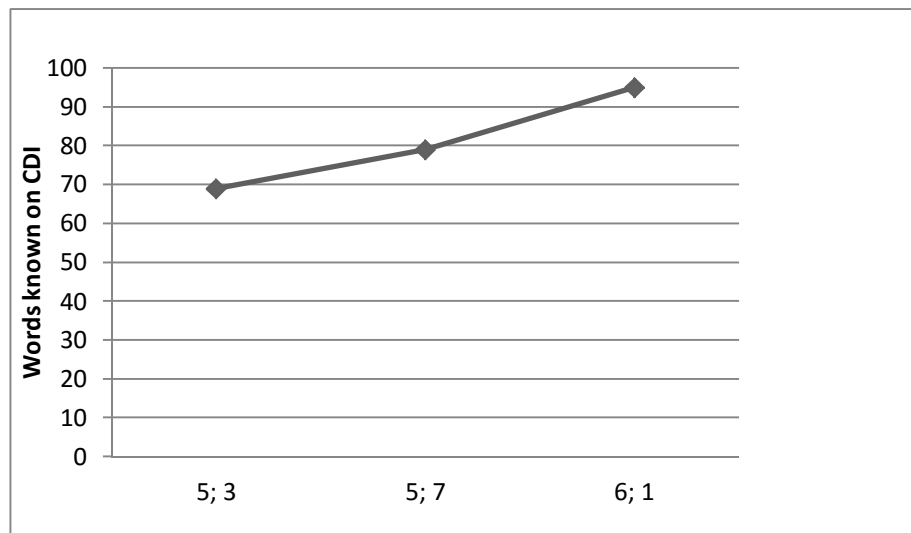


Figure 1. The vocabulary growth expressed as the percentage of known words on the English CDI.

Table 2. English CDI Score Summary

CDI no.	Age	Vocabulary checklist (Mother)	Vocabulary checklist (Father)	Syntactic complexity items (Mother)	Syntactic complexity items (Father)	Language use items (Mother)	Language use items (Father)
1	5;3	69 (69%)	71 (71%)	12 (100%)	12 (100%)	11 (92%)	11 (92%)
2	5;7	79 (79%)	79 (79%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)
3	6;1	95 (95%)	95 (95%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)

Table 3. The Mean Length of Utterance (MLU) for the Longest English Sentences

Test	Age	MLU	SD
1	5;3	5.75	1.79
2	5;7	8.80	3.10
3	6;1	11.75	2.49

Arabic CDI

Each report was hand scored according to the scoring procedure mentioned in the Arabic testing manual (Dashash & Alsafi, 2014). The child's raw scores were converted to percentiles for each main section and for each subsection. The results of the first CDI at age 5;3, the first section (vocabulary checklist), showed that the child produced just 93 words, 10.36% of a total 897. The child's age equivalent in this section was 18 months, 20th percentile. In other words, Kinan's lexical development lagged behind his Arabic speaker peers. The scores of the word endings, verb tenses, usage, irregular plural nouns, and complex sentences subsections indicated that the child had a small vocabulary size and scored at the age equivalent of a 18-25 months old, 20th percentile (see scores details in T4).

The results of the second and the third reports showed that the child developed only on the vocabulary checklist sub-section. Kinan acquired 55 words on the second report and 31 more on the last report; he continued to place dramatically behind his age group. The MLU of Kinan's three longest sentences was 2 on all Arabic CDI forms. Since both parents completed the CDIs, inter-rate reliability was calculated by counting

the total number of agreements among the two scorers as shown in T5.

Table 4. Arabic CDI Score Summary

CDI No.	Age	Section type	Raw score	Items total	Percentile
1	5;3	Part one: Vocabulary checklist Part two: Grammar and sentences. A. Words endings B. Verb tense C. Words D. Irregular plurals E. Complex sentences	93 0 1 2 1 0	897 (10.36%) 7 7 (14.28%) 5 (40%) 5 (20%) 36	20
2	5;7	Part one: Vocabulary checklist Part two: Grammar and sentences. A. Words endings B. Verb tense C. Words D. Irregular plurals E. Complex sentences	148 0 1 3 1 0	897 (16.50%) 7 7 (14.28%) 5 (60%) 5 (20%) 36	20
3	6;1	Part one: Vocabulary checklist Part two: Grammar and sentences. A. Words endings B. Verb tense C. Words D. Irregular plurals. E. Complex sentences	179 0 1 2 1 0	897 (19.96%) 7 7 (14.28%) 5 (40%) 5 (20%) 36	20

Table 5. The Inter-Rater Reliability of the Parents' CDIs

Test.	Age	CDI Version	Total No. of Items	Total Agreements	Percent Agreement
1	5;3	English	125	122	97.6 %
2	5;7	English	125	125	100%
3	6;1	English	125	125	100%
1	5;3	Arabic	958	956	99.7%
2	5;7	Arabic	958	953	99.5%
3	6;1	Arabic	958	951	99.2%

PPVT-4 Performance

Because of the technical mistake with the first two administrations of the PPVT-4, only the third administration is reported here. The result at age 6;1 showed that Kinan's raw score was 131, which is calculated by recording the ceiling item number, which is the last item in the ceiling set. The ceiling item number was 156. The total number of errors was 25, which was subtracted from the ceiling item number. Thus, the raw score was 131, the standard score 122, and the 90% confidence interval was 116-127. His score fell into statine 8 and the growth scale value (GSV) was 163. The percentile rank was 93, which indicated that Kinan scored better on the English vocabulary test than 93 percent of his peers who are the same age. Overall, the PPVT-4 score indicated that after 3 years and 5 months of immersion in English, the child's receptive English vocabulary was in the moderately high score range for his biological age on a standardized test that was normed on monolingual native English speakers.

Table 6. PPVT-4 Score Summary

Age	Raw Score	Standard Score	90% Confidence Interval	Percentile	Statine	Age Equivalent	Overall Evaluation
6;1	131	122	116 - 127	93	8	8;2	Moderately high

The Overall Results of the Frog Story Tests

The first part of the analysis for the frog story as shown in T6 presents that the mean length of utterance (MLU) scores increased over the four tests. The MLU score rose from 8.32 (age 5;3), 7.86 (5;7), 8.74 (6;1), and 9.29 (6;2). Both the number of utterances and the ratio of morphemes to utterances (MLU) increased over time. The expected MLU for words for age 5;0 – 5;5 is 4.38 (SD = 0.63), for age 5;6 – 5;11, 4.47 (SD = 0.61), and for age 6;0 – 6;5, 4.57 (SD = 0.66) (for MLU norming tables, see T4 in Rice et al., 2010).

The results of the frog story narration test also indicated that the number of types (calculated by FREQ) and the lexical diversity (calculated by VOCD) of the child’s speech grew over time. The total number of tokens produced by the child was 333 on the first test, 228 on the second test, 306 on the third test, and 381 on the fourth and final test. The following is an example of Kinan’s story telling, which was recorded at the age of 5;3.

Frog where are you? Frog where are you? Once upon a time there is a boy he got a frog. And the frog is almost gone to take a closer look. And when is the time the boy going to bed today, he slept all the time. And the frog have to get out of the jar. And when this morning, and the boy must saw empty jar. And he look frog

frog and he look out frog frog frog. And he look and the dog say and he is so mad of the frog. And he was in a forest, and he say frog frog where are you frog frog where are you. You have to get in the jar right now. And when he saw a bees' house, the dog wants to go and get honey. And when he is gone to push the tree over and he said. And the boy said hey frog where are you, you are jumping frog. And oh no there is a bees behind me I don't want to get the bees said the dog. And he fell down. The owl no don't chase me owl I'm going to beat you if you chase me. Frog frog where are you. Oh he saw a reindeer and he is a flying one. And the reindeer is going to drop this boy inside the water. And he said wow get me out of here. And he tell something in there. Splash and splash and the boy and the dog and. And he say let's see in the log. And he saw Mom frog and daddy frog and there is a baby frog. We have one two three four five six seven. And he got a one frog the whole day and he said bye to this family. He is got the frog have family one two three four five six seven eight nine families and that is the end.

The child's lexical diversity scores showed a high level of vocabulary diversity.

The lexical diversity (D) averages, drawn on 100 randomly selected samples within each frog story transcript by the VOCD software, indicated that the child used more different types over time. To further analyze the child's spontaneous speech for lexical diversity, I located the advanced words within his frog story transcripts by running the FREQ program in the CLAN program group. Frequencies were calculated both for content words (open class) and for function words (closed class). In addition, I calculated frequencies for advanced words using the following method. I created a wordlist for types that are included on the CDI-III; these words were treated as high-frequent words in child language. I ran a frequency analysis to exclude closed class words and the CDI-III words. The remaining words were categorized as advanced words. I further validated this categorization by checking these words against Biemiller's Words Worth Teaching Ratings (Biemiller, 2010). Every word that appeared in Biemiller's list was counted as an advanced word. Kinan's frog stories contained 17 advanced types in total on the four

transcripts; these were *beat, buzzing, log, suddenly, lop, jar, stung, snore, snoopy, snores, suck, chase (chasing), forgot, saw, climb, Froggie, hole, and splash*. Consequently, the child's lexical sophistication was expressed by using the Advanced Guiraud's index (Daller, Milton, & Treffers-Daller, 2007). The Advanced Guiraud was calculated as the ratio of the advanced types to the square root of total tokens; this statistic was 0.48 ($17 / \sqrt{1,248}$). The ratio of the advanced words was the indication of the child's growing lexical sophistication. The Guiraud index was obtained by calculating the ratio of the open class types and the square root of the total tokens. The ratio of the lexical density also increased over time and gave an indication of steady syntactic development. All of the lexical measures of the frog story narrative are detailed in T7.

The findings also showed that Kinan's linguistic abilities in English compared favorably to both bilingual and monolingual peers of the same age. Existing frog story narratives provided a basis of comparison for Kinan's production: one control child was a native speaker of English at age of 6;1; he was selected from the Vocabulary Profiler (Cobb, nd.) database (child 10 frequency band, and 250 word list). The second child was a non-native speaker selected from CHILDES corpora. T8 shows how Kinan's production measured against the two control children. Kinan's utterance length (MLU) and lexical diversity (D) were much higher than the bilingual control peer's, and his MLU was also higher than the monolingual peer's.

Table 7. Lexical Measures of Four Frog Stories

Test	Age	Utterances	Total Tokens	Total Types	Content Types	Function Types	TTR	MLU	SD	D Average	Guiraud	Lexical Density
1	5;3	40	333	99	68	22	0.29	7.86	3.25	22.64	3.73	1.21
2	5;7	29	228	83	65	18	0.36	8.33	2.34	28.50	3.83	1.06
3	6;1	35	306	92	69	24	0.30	8.74	3.90	24.30	3.95	1.37
4	6;2	41	381	110	100	38	0.28	9.29	4.62	22.26	5.61	2.13

Table 8. Comparison Group Scores Summary

Child	Age	Tokens	Types	TTR	MLU	D Average
Kinan	5;7	228	83	0.36	8.33	28.50
NNS Control Child	5;7	234	81	0.34	5.85	20.52
Kinan	6;2	381	110	0.28	9.29	22.26
NS Control Child	6;2	277	111	0.40	6.13	33.33

Parents' Interview

Parents' interview data revealed that Kinan was exposed to the English language much more than the Arabic language. As the parents reported, they talked in both languages inside and outside home. The parents mentioned that when they spoke to Kinan in Arabic, he understood and responded to them. Otherwise, when he did not understand something, they switched to the English language. Kinan interacted with all household members, who are his mother, father, and his younger sister. The parents reported that Kinan liked talking about what happened and what he learned at school. Other topics that he would frequently discuss were his favorite toys and his grandparents. As reported by the parents, there was no exposure to the Arabic language from other people outside the home. The main source for Kinan's Arabic language development was only from inside the home, and the main source of his English mostly was from his school. The parents reported that Kinan was spending seven hours a day in school; he interacted with his peers without any communication problems. The parents also stated

that Kinan's grades were high and his academic level was similar to his monolingual classmates. The parents indicated that they did become worried about Kinan's Arabic language development, so they started to teach Kinan Arabic using Iraqi curriculum. The parents were more confident about Kinan's eventual Arabic language development because they plan to return to their home country, where he would be once again immersed in Arabic.

DISCUSSION

This study had four critical questions regarding the focus child's bilingual development. The first question related to the bilingual milestones theory. With respect to whether the focus child was progressing with the same developmental milestones as monolingual children, the results obtained from this study provide support for the claim that bilingual children follow the same trajectories as their monolingual peers. Evidence was that Kinan's scores obtained from his English acquisition data of the frog story tests during the study period 5;3 to 6;1 including MLU, vocabulary size, and lexical diversity were similar to the scores of Kinan's monolingual peer. Kinan showed rapid linguistic improvement in English more than Arabic. Lexical measures analyses indicated that the child progressed in the dominant language, English, similarly to the developmental trajectories of monolingual children, regardless of the bilingual exposure in the home. These results supported the findings of a study by Petitto, Katerelos, Levy, Gauna, Têtreault, and Ferraro (2001), who found that bilingual children's linguistic growth followed the same developmental milestones as monolinguals.

What was unexpected in this paper was that the focus child did not develop in his mother language, Arabic; Kinan's development dropped off the Arabic developmental trajectories in spite of his parents' linguistic skills in both languages. Kinan could not tell the frog story in Arabic. This fact could be attributed to inadequate exposure to the Arabic language inside and outside home. Both lexical and syntactic development halted in the native language after Kinan's immersion in English. Kinan's language

development seemed to be influenced by several factors, such as the impact of the interaction settings and the quantity of child-directed speech in Arabic. These results support the findings by Hoff (2006), who concluded that greater access to target language resulted in more rapidly developing language skills. This would suggest that Kinan's access to Arabic was inadequate for language growth.

Previous research found that bilingual children at the age of 0;8 to the age of 2;6 could acquire vocabulary similarly to monolingual children. Both bilingual and monolingual children progressed at the same developmental rate, for example in Pearson and Fernandez's study (1994). The results of this paper do not support the latter findings; Kinan's linguistic milestones followed the same trajectories as monolinguals but not on the same rate. Evidence for this result was that Kinan started learning English at the age of 2;8. Children usually reach the first word milestone around the age of 1;0, the combination of the two words are by the age of 1;6, and the production of the 50-words at the age 1;7 (Petitto, et al., 2001). Here the findings indicated that Kinan's early vocabulary development was entirely in Arabic until the age of 2;8 and mainly in English thereafter. Unlike in the study by Pearson and Fernandez (1994), Kinan's rate of development stalled in Arabic while his English development followed an accelerated rate. These results could be attributed to the amount of access to the two languages.

The third question of the study was whether the focus child acquired the two languages simultaneously or sequentially. The findings revealed that Kinan was a sequential bilingual. His exposure to the second language (L2) started later in childhood when his age was 2;8. The results of this paper showed that Kinan abandoned speaking

Arabic when he resided in the U.S; one reason could be attributed to the parents' intention to support Kinan's growth as a bilingual, which made them welcome his efforts to communicate in English. The other reason was that Kinan spent most of his time in childcare, where he had a abundant access to English, which eventually contributed to becoming English dominant. Although Kinan acquired English later in his childhood, he was became highly very quickly; he seemed to have high aptitude for learning the second language. His interest and motivation were also important factors in his second language development. In contrast, Kinan had limited access to the mother tongue, which was not spoken outside the home. Here the role of the language community for raising bilingual children was apparent. Raising bilingual children requires a fair amount of access to both languages. Several factors could affect the child's language development, such as the community, school, and family. The results of this paper suggest that the parents' desire to raise a child bilingually is insufficient for balanced bilingual development; even if the minority language is spoken in the home, children must have adequate motivation to use it. Parents cannot take bilingual development for granted; rather they must invest a great deal of effort into ensuring that children are actually using both languages. In the present study, Kinan's parents should communicate and encourage Kinan to use his mother language as well as keep working on his second language. They should assign importance to each language and should convey to their child that both languages are worth learning. Learning two languages has lifelong benefits; children who are balanced bilinguals will be able to communicate cross-culturally, interact within diverse cultures, communicate

authentically with more people, have better metalinguistic awareness, and enjoy numerous academic advantages.

As for the fourth question, Kinan presented as a dominant bilingual child; it was difficult for Kinan to use the two languages equally. Kinan's Arabic language skills were very basic, equivalent to the language skills of a two-year-old. Although young children tend to be robustly influenced by their parents, Kinan's parents could not control his preference for using English. Kinan's preference to work with his dominant language, English, could be attributed to his eagerness to fit into his peer community (Petitto et al., 2001). The focus child's own preferences for language use were powerfully shaped by his desire to be a competent communicator in the language that he perceived to be more useful in his environment. One might wonder whether the parents of bilingual children are able to raise their children to be perfectly balanced bilinguals or not. It seems that the idea of a completely balanced bilingual is more of an ideal than a reality; although not entirely unattainable, it is uncommon. Nevertheless, as long as parents remain insistent in their efforts and carefully test methods to help overcome difficulties that inevitably arise with language use, they should be able to succeed in raising a child who is a competent communicator in two languages.

This chapter has summarized the findings of the present study, and discussed them with reference to the four critical questions. The results have also been considered in relation to appropriate previous studies. This study evinced the rapid lexical growth of a bilingual child over time. It supported the claim that bilingual children develop in the

same way as their monolingual peers. The study also revealed that the child's own preference for language use was an important factor in shaping the language growth.

The primary goal of the current study was to investigate the child's lexical development over six months, and in particular, to examine the child's receptive and productive vocabulary. The secondary goal was to explore how the child's vocabulary size grew in the two languages. Four data collection methods were used, the CDI-III, PPVT-4, the frog story tests, and a parent interview.

The results reviewed in the previous sections have noteworthy theoretical significance as well as pedagogical implications for parents and children. This study reflected controversies about the outcomes of raising a child bilingually in early childhood. Some research indicated disadvantages, such as lexical development delay and a smaller vocabulary size than that of monolingually-developing children. During the study period (age 5;3 – 6;2), the findings of this research illustrated two main conclusions: one was that Kinan progressed in the dominant language, English, similarly to the developmental trajectories of monolingual children, but not on the same rate. Second was that Kinan's development in his mother language dropped off the Arabic development trajectory in spite of his parents' linguistic skills in both languages. The healthy and robust development in the child's dominant language meant that he was developing as a monolingual child, at the cost of not developing his mother tongue. In fact, the child was not a balanced bilingual, had only very basic Arabic language skills at the level of a two-year-old, possibly even lower than he had at the time of his arrival to the United States at 2 years and 8 months. Kinan's apparent plateau in his mother

language may be best explained by his limited exposure amount to Arabic, and the influence of the dominant language community. The child favored the use of English within the community, which the parents allowed and accepted, welcoming his English language growth without intentionally working on the mother tongue. If the child continued developing this way, it would be unlikely that he would develop native or even advanced proficiency in Arabic and he would likely progress along the linguistic trajectory of a monolingually developing child, who also has some additive language skills in Arabic, mainly the ability to comprehend some vocabulary and basic communication. Kinan's parents realized the unexpected challenge of raising their child to be a balanced bilingual. However, they could rebalance Kinan's two languages by spending more time and effort to work on the child's mother language.

The findings have implications for other children who are developing bilinguals in families where the home language is not spoken in the community. In the case of Kinan, the parents were proficient speakers of English, but in many bilingual families, if the child became dominant in English and the parents were not proficient in English, this would cause communication problems within the family. If the parents were not proficient in the second language, the child would not have rich language input to draw on. Therefore, the child's language development would mainly come from sources outside the home, which would limit the child's language development.

The sample size was the most evident limitation in this study; one case does not allow us to draw definitive conclusions. Further, even though the study was longitudinal,

it captured lexical growth within less than a year. Extending the time frame of research would capture a more complete trajectory of bilingual lexical development.

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APPENDICES

Appendix A. Human Subjects IRB Approval

From: MSU IRB

Date: 5/15/2015

RE: Notice of IRB Exemption

Exemption Category: 1.Educational setting

Study #: 15-0471

Study Title: An Investigation into the Knowledge of the Receptive Vocabulary and the Lexical Development Over Time: A Case Study on Sequential Bilingual Arabic-English Speaking Child

This submission has been reviewed by the Missouri State University IRB and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

Investigator's Responsibilities:

If your study protocol changes in such a way that exempt status would no longer apply, you should contact the above IRB before making the changes.

CC:

Seba al-Hindawy

Appendix B. Frog Story Data

Frog Story 1

@Begin

@Languages:eng

@Participants:CHI Kinan Target_Child

@ID:eng|Kinan|CHI|5;3.4|||Target_Child|||

@Date:30-JUN-2015

*CHI:frog where are you?

%com:he turns the page

*CHI:frog where are you?

*CHI:Once upon a time there is a boy he got a frog.

*CHI:and he and the frog is almost going to take a closer look.

*CHI:and when is the time the boy going to bed today.

%com:he turns the page

*CHI:and he slept [/] slept [/] all the time.

*CHI:and the frog have to get out of the jar.

*CHI:and and when this morning and the boy must saw empty jar.

%com:the child turns the page

*CHI:and he look frog frog frog.

*CHI:and he look out frog frog frog.

*CHI:and he look and the dog say.

*CHI:and a dog and he is so mad of the frog.

%com:the child turns the page

*CHI:and he was in a forest.

*CHI:and he say frog frog where are you.

*CHI:frog frog where are you you have to get in the jar right now.

%com:the child turns the page

*CHI:and when he saw a bees house the dog want to go and get honey.

*CHI:and when he is going to push the tree over.

*CHI:and he said [/] and the boy said hey frog where are you.

*CHI:you are jumping frog and [/].

*CHI:oh no there is a bees behind me.

*CHI:I dont want to get the bees said the dog.

%com:the child turns the page

*CHI:and he fell down the owl.

*CHI:no don't chase me owl.

*CHI:I'm going to beat you if you chase me.

*CHI:frog frog where are you.

%com:the child turns the page
*CHI:oh he saw a reindeer.
*CHI:and he is a fly one.
*CHI:and the reindeer is going to drop this boy inside the water.
%com:the child turns the page.
*CHI:and he said wow get me out of here.
*CHI:and he tell something in there.
%com:the child turns the page.
*CHI:Splash and splash and the boy and the dog.
*CHI:and he said a.
*CHI:and he say let us see in the log.
*CHI:and he saw Mom frog and baby frog.
*CHI:and there is a baby frog.
*CHI:we have one two three four five six seven.
%com:the child turns the page.
*CHI:and he saw a one frog the whole day.
*CHI:and he said by to this family.
*CHI:he is got the frog have family one two three four five six
seven eight nine families.
*CHI:and that is the end.
@End

Frog Story 2

@Begin
@Languages:eng
@Participants:CHI Kinan Target_Child
@ID:eng|Kinan|CHI|5;7.||||Target_Child|||
@Date:30-SEP-2015
*CHI:frog where are you?
%com:he turns the page
*CHI:once upon a time
*CHI:there is a boy who have a pet frog.
*CHI:he was going to go to bed tonight to let the frog sleep.
*CHI:then he was sleeping.
*CHI:and he snore and snore.
*CHI:and suddenly come out the frog.
*CHI:and he said be quite don't the boy.
*CHI:and one morning he wakes up in the morning.
*CHI:and look down down the bed.
*CHI:and there is no frogs.
%com:he turns the page
*CHI:and suddenly there is no frog in the shirt.

*CHI:and there is no frog in the can.
*CHI:so frog where are you and stop dog.
%com:he turns the page
*CHI:now he said froggie froggie froggie.
*CHI:and he said looking there froggie froggie.
*CHI:look in that rat.
%com:he turns the page
*CHI:then he look in the owls home.
*CHI:and there is.
*CHI:and run run and run help me the bees are chasing me.
%com:he turns the page
*CHI:then he look and owl get away from me.
*CHI:and owl go away and he say froggie froggie.
%com:he turns the page
*CHI:there is a reindeer into his head.
*CHI:and then the reindeer take him splash into the ocean.
*CHI:and oh no to the river.
*CHI:and he was thinking he was chasing.
*CHI:and he said be quite frog is there in to the river.
%com:he turns the page
*CHI:and there are some frogs dad and mom frogs.
*CHI:and there is a baby he is brother frogs and he took [/] the
brother frog.
*CHI:and he was going home the end.
@End

Frog Story 3

@Begin
@Languages:eng
@Participants:CHI Kinan Target_Child
@ID:eng|Kinan|CHI|6;1.||||Target_Child||
@Date:30-DEC-2015
*CHI:frog where are you?
%com:he turns the page
*CHI:frog where are you?
*CHI:It was a busy day at night.
*CHI:then a little boy and his puppy had a dog in his jar.
*CHI:well i see said the boy then in the next day of [//] next
day is night.
*CHI:then the frog try to speak and he snore they boy snore [//]
like.
*CHI:and then [//] morning the [//] frog was gone.

*CHI:then he feel so sad.
*CHI:then he rush out to the door.
*CHI:then frog where are you frog where are you.
*CHI:he then the frog sometimes the boy just look at the dog
he fall out.
*CHI:then he said be quite we are looking for the frog.
*CHI:then he jumps out the window.
*CHI:then frog where are you frog where are you.
*CHI:then the dog think he want to eat a bee.
*CHI:then the boy said where are you in the hole and scoopy you
hello there hello there hello there.
*CHI:and then you stung inside the hole.
*CHI:and then then the dog is run to get it.
*CHI:then the bee was chasing them.
*CHI:then the bee was and then he climb the tree with a hole.
*CHI:and then frog where are you.
*CHI:and there is owl.
*CHI:and get a way get a way get a way get a way said the boy.
*CHI:and get a way get a way said the boy again.
*CHI:then come to a reindeer.
*CHI:then drop then drop into the river.
*CHI:and then drop him his puppy.
*CHI:and then splash [=! laughing] into the river.
*CHI:and then he is come to a lop.
*CHI:and then frog where are you.
*CHI:then there were mom frog and papa frog.
*CHI:then there is another baby is coming now.
%com:he turn the page
*CHI:then his brother then they leave.
*CHI:and they said good bye frog.
*CHI:and the frog said good bye good bye good bye good bye good
bye the end.
@End

Frog Story 4

@Begin
@Languages:eng
@Participants:CHI Kinan Target_Child
@ID:eng|Kinan|CHI|6;2.0|||Target_Child||
@Date:17-JAN-2016
*CHI:frog where are you?
%com:he turns the page.

*CHI:frog where are you?
%com:he turns the page.
*CHI:Once upon a time there is a little child named Lally.
*CHI:he was a cool kid I ever saw.
*CHI:he have a pet frog.
*CHI:he got him from a log.
*CHI:he don't know about logs and frogs.
*CHI:he said to his self.
*CHI:when it is almost time to go to bed.
*CHI:that the his self when it is time to bed the frog was sneaking out.
*CHI:but in the morning he woke up and there is no frog and there is nothing.
*CHI:and he said froggie froggie where are you he shouted.
%com:he turns the page.
*CHI:then he say frog where are you frog where are you but then the dog suck his face in the bed and he said.
*CHI:then he said then he coughed.
*CHI:then he looked at the window and he said frog where are you.
*CHI:then fall down and the boy forgot it.
*CHI:but then he jumped out the end of the glass just crashed like this.
*CHI:and then the boy was mad.
*CHI:then he said frog where are you.
*CHI:then the dog saw some buzzing bees having frog back to their home.
%com:he turns the page.
*CHI:and ok then he look in the hole and said frog where are you and the dog try to get honey yummy he said.
*CHI:the dog said like.
*CHI:then he dicovered the dog that was a stinky mouth.
*CHI:then the dog bark like he said.
%com:he turns the page.
*CHI:then he dropped it.
*CHI:then they starting to chase the bees he ask.
*CHI:then the dog bark like a fox but he did not.
*CHI:he look in the hole Lally.
*CHI:and then he saw owl and he said aw that hurt get away from me.
%com:the child turns the page
*CHI:then he said there is a buzzing bee was chasing me.
*CHI:he said the dog then he start to chasing.
*CHI:then he stopped to chasing me.

*CHI:then he said get out away.
*CHI:and stop it following me baby.
*CHI:then he said frog where are you.
*CHI:then the reindeer then splash splash then splash.
*CHI:then he was funny then he said.
*CHI:then he said sh the dog was sleeping and.
*CHI:then he look and there is some mama frog and papa frog.
*CHI:and a baby brother and sister as well.
*CHI:and he the baby frog and he live happily ever after the end.
@End