Title
Bilingual Exposure and Language Development in Children At-Risk for Language Disorders.

Author
Pai, Vidya

Publication Date
2013

Vidya Pai

Bilingual Exposure and Language Development in Children At-Risk for Language Disorders

INTRODUCTION

As of 2005 an estimated 54 million Americans over the age of five years speak a language other than English at home[1]. This high prevalence has sparked increasing interest in the impact of multiple language exposures on language development. Definitions of bilingualism are not standardized. Bilingualism can refer to the language of the child or the characteristics of the environment. In this study, we will refer to bilingualism as exposure to more than one language early in life. Bilingual exposure usually occurs in one of two ways: (1) when children are exposed to two languages in the home with family members (usually simultaneously) or (2) when children hear one language at home and another language outside the home, such as in a child care or early education setting (often sequentially) [8].

The current consensus is that bilingual exposure does not have an adverse effect on otherwise healthy and typically developing children. In fact, a small number of studies have even shown bilingualism to be advantageous for language and cognition. Early reports of bilingualism and its association with language development difficulties may have been confounded by socioeconomic status, because until recently, bilingualism was more prevalent among lower socioeconomic status groups[4,5,7,9].

Several studies have specifically investigated whether bilingual exposure or bilingual language learning is associated with the development of specific language impairment (SLI) or other communication disorders. The evidence suggests that SLI is not more prevalent among typically developing bilingual children than monolingual children. In a study of Swedish-Arabic bilingual preschool-aged children with SLI, Salameh et al. report that children acquired language using the same grammatical processes as their matched peers without SLI but at a slower rate[20]. Paradis et al. also report that monolingual and bilingual children with SLI do not differ in their grammatical accuracy in English[18]. Westman et al. compared NEPSY language scores between Swedish-only and Swedish-Finnish-speaking preschool-aged children at risk for SLI and found similar language profiles regardless of the monolingual or bilingual exposure. In this study, children were considered at risk for SLI if they scored in the lowest 20% on expressive and receptive language screening tests[28]. Research shows that the quality of linguistic input is particularly crucial

for language-impaired children learning more than one language[21,25]. Finally, bilingual language development is not associated with higher rates of stuttering than single language learning[15].

Very few studies have examined the issue of the development of language in children at risk for or with developmental disorders as a function of the number of languages the child is exposed. Bird et al. compared vocabulary size in monolingual-English and bilingual children with Down Syndrome and found no detrimental effect of bilingual exposure on English vocabulary development[6]. A study about intervention for a child with autism whose environment was bilingual for Korean and English described the speech/language pathologist's decision to focus on English and then add Korean to the program; the child eventually learned vocabulary in both languages. Clinicians are regularly asked to make recommendations as to whether these children should be exposed to two languages and there is little evidence to inform the clinician's advice[6,29]. The few studies that exist do not provide adequate guidance to clinicians for them to advise parents about the home environment or to advocate for children regarding the language of education and therapy. Clearly, more information is essential. As an initial effort to fill this crucial knowledge gap, we compared vocabulary size in young children with monolingual and bilingual exposure within two clinically significant populations at-risk for language delays.

The goal of this study was to compare the development of vocabulary in children at risk for developmental disorders who were exposed to one or two languages. Study 1 assessed children attending a High Risk Infant Follow-up Clinic, most of whom were born preterm. Each year in the United States alone, over 50,000 infants weighing less than 1500g go on to survive the neonatal period; up to 50% of these children later develop cognitive or behavioral disturbances, including language difficulties, that impact their school performance[20,26,27]. Children who are born preterm have been shown to have an increased incidence of language delay and premature birth is a known risk factor for SLI[11,23]. One study of very low birth weight infants in Germany found that parental bilingualism was not favorable for cognitive and language development; however, bilingualism may have been a proxy for low socioeconomic status within this population[28].

Study 2 assessed children diagnosed with an Autism Spectrum Disorder (ASD). Children with ASDs also make up a significant subset of children with language difficulties. In the United States alone it is estimated that the prevalence rate for ASD is 6.7 cases per 1000 children[3,10]. Significant heterogeneity exists in terms of language skills among children with ASD; some children have normal language abilities while other children are considerably impaired[13]. Studies have found that the language profile of many language-impaired children with ASD is similar to

that of children with SLI[2,13]. One study by Hambly et al. suggests that bilingually-exposed children with ASDs do not experience additional delays in language development[12]. Because children with ASD may have difficulty acquiring even one language, it is vital to understand how a bilingual environment can affect language development[24].

Because of the lack of research on bilingual language exposure in children born prematurely and in children with ASD, uncertainty remains in the clinical setting as to how to most effectively facilitate early language development. We aim to address whether bilingual exposure affects the amount of verbal and nonverbal productions in children born prematurely (Study 1) and in children with ASD (Study 2).

METHODS

Participants

In Study 1, participants (n=80, 34 monolingual and 46 bilingual) were 12 to 36 months of age (monolingual mean = 19.6, bilingual mean = 21.2). Fifty-six percent of monolingual and fifty percent of bilingual children were male. Participants were recruited from the High Risk Infant Follow-Up (HRIF) Program at Lucile Packard Children's Hospital at Stanford University. Patients in the clinic have a history of preterm birth (<37 weeks gestational age). Exclusion criteria included evidence of global cognitive impairment IQ<70 and Non-English monolingual families.

In Study 2, participants (n=46, 31 monolingual and 15 bilingual) were 12 to 72 months of age (monolingual mean = 40.5, bilingual mean = 42.0). Eighty percent of monolingual and sixty percent of bilingual children were male. Participants were recruited from the Developmental Clinic at Lucile Packard Children's Hospital and included those children with a diagnosis of autism.

Written informed consent was obtained from all participants' parents. The Stanford University Panel on Human Subjects in Medical and Non-Medical Research approved all procedures. All English monolingual and English/Non-English bilingual families attending clinic on randomly chosen recruitment days were invited to participate in the study. Participants were recruited between January and December 2008, and between June 2010 and August 2010. A child was classified as bilingual if the parent/guardian reported that the child was regularly exposed to a second, Non-English language. This exposure was considered significant if it represented child-directed language from a fluent speaker.

Behavioral Data

Parents completed a questionnaire (Appendix 1) yielding information about their child's language development and the parents' linguistic profile. The questionnaire was adapted from the MacArthur-Bates Communicative Development Inventory (CDI)[11,16] and from established surveys of adult linguistic acculturation[14,17]. The MacArthur-Bates CDI was originally created in English but has since been adapted into numerous languages[14]. These adaptations have been used extensively to study both monolingual and bilingual language development in numerous languages. The MacArthur-Bates CDI has also been applied to populations of children at-risk for language delays to study monolingual language development in children born prematurely[11] and to compare monolingual and bilingual language development in children with Down Syndrome[6].

In the present study, the questionnaire contains four sections. In section one, parents provided demographic information about themselves and their child. In section two, parents provided information about their own language background, which language(s) they use regularly and in which contexts, and the language(s) spoken in the child's home. Section three is adapted form the MacArthur-Bates CDI. Parents completed the "Actions and Gestures" section from the CDI: Words and Gestures form and the "Words and Sentences" section from the CDI: Words and Sentences. In the "Words and Sentences" section, bilingual families indicated whether the child spoke each word in English, the Non-English language, or both. In section four, parents completed a language diary of their child's activities and corresponding language exposure for seven days. The first three sections were completed in clinic, and the fourth section was completed at home and returned by mail. Unfortunately, because of poor return rate, the language diary part of the questionnaire had to be excluded from the study.

Parental education was calculated based on the average of maternal and paternal education using the following classification: less than high school (0), high school (1), associate's degree (2), college or greater (3). Numerical acculturation responses were summed to generate overall acculturation scores for families, ranging from 0 (least acculturated) to 50 (most acculturated). In order to calculate the acculturation score, parents were asked to indicate on a scale from one to five to what degree they used English versus another language in different situations. Raw scores from the "Actions and Gestures" and "Words and Sentences" sections were converted to standardized, age-adjusted percentiles following CDI instructions. For subjects whose age was outside the standard range of the assessment, the nearest age within range was used to determine percentile. For bilingual participants, three raw scores were calculated from the "Words and Sentences" responses:

English, Non-English, and English plus Non-English. English and English+Non-English raw scores were converted to percentiles, while Non-English raw scores were not. The "Actions and Gestures" scores measured nonverbal communication, and the "Words and Sentences" scores measured expressive vocabulary production.

Statistical Analysis

We conducted group comparisons using Student's t-test, and ANOVA. We tested for associations using Spearman's rho. We tested for correlations between gestational age; acculturation scores; nonverbal communication; and English, Non-English and English+Non-English vocabulary production while partialling out the effect of age. Stepwise linear regression tested whether age, gender, or monolingual vs. bilingual exposure predicted English+Non-English vocabulary production. A repeated-measures general linear model tested for within- and between-participants effects of age, nonverbal communication, vocabulary production (English, Non-English), and monolingual vs. bilingual exposure. All statistical calculations were done with SPSS 16.0 for Windows. We set statistical significance at $p<0.05$.

RESULTS

Study 1

Participants

Table 1 summarizes the demographics for all participants from the High-Risk Infant Follow-up Program. There are no significant differences between the two groups. Among the bilingual participants, the correlation between parental acculturation scores and the child's English+Non-English vocabulary raw score was not significant when controlling for age (rho=-.004, p=0.977).

Communication Outcomes

Table 1 also summarizes participants' average nonverbal and verbal communication data. Participants, as a group, scored in the normal range for nonverbal communication scores, but below average on verbal communication measures. While average nonverbal communication percentiles for both monolingual and bilingual participants were within the normal range, the English and English+Non-English vocabulary production percentiles for both sub-groups were well below the normal range. Sub-group differences did not reach statistical significance. Stepwise linear

regression revealed that age (beta=0.549, p<0.001) was associated with English vocabulary raw scores (F=31.27, adjusted R^2=.286), while gender and monolingual vs. bilingual exposure were not.

Table 2 depicts the correlations between gestational age, nonverbal, and verbal raw scores, when controlling for the effect of age. Correlations between nonverbal communication and English vocabulary (rho=0.575, p<0.001) and English+Non-English vocabulary (rho=0.638, p<0.001) attained significance, while the correlation between nonverbal communication and Non-English vocabulary did not (rho=0.277, p=0.072). Figure 1 depicts total vocabulary (English+Non-English) raw scores vs. age for all participants.

Study 2

Participants

Table 3 summarizes the demographics of the autism group. The monolingual group was twice as large as the bilingual group. Among the bilingual participants, the correlation between parental acculturation scores and the child's English+Non-English vocabulary raw score was not significant when controlling for age (rho=.013, p=0.913). The difference in Non-English vocabulary raw score is approaching significance; with a larger population a significant difference should be found.

Communication Outcomes

Table 3 also shows participants' average nonverbal and verbal communication data. . 29% of the monolingual and 20% of the bilingual participants were nonverbal. Stepwise linear regression showed that age (beta= 0.566, p<0.001) was associated with English vocabulary (F=15.5, adjusted R^2=.261); gender and monolingual vs. bilingual exposure were not.

Table 4 illustrates the correlations between nonverbal and verbal raw scores when controlling for the effect of age. Correlations between nonverbal communication and English vocabulary (rho=0.549, p<0.001) and English+Non-English vocabulary (rho=0.539, p<0.001) attained significance. Correlation between nonverbal communication and Non-English vocabulary was approaching significance (rho-0.294, p=0.050). There was also a correlation between English vocabulary and English+Non-English vocabulary (rho=0.992, p<0.001). No correlation was found between Non-English vocabulary and English+Non-English vocabulary. Figure 2 depicts total vocabulary (English+Non-English) raw scores vs. age for both groups in this population.

DISCUSSION

In Study 1 we report a novel finding that monolingual vs. bilingual exposure is not associated with differences in total vocabulary production in a sample of 12- to 36-month olds at-risk for language delay. Among our participants, measures of early language development and expressive vocabulary production were reduced; however, bilingual exposure was not associated with any further reduction in expressive vocabulary production compared to children exposed to only English. We addressed the current lack of understanding of early language development in premature children at-risk for language delay by comparing English language development outcomes between monolingual and bilingual children in this population. In our cohort of at-risk children, we corroborated previous findings that bilingual exposure is not associated, either positively or negatively, with differences in expressive vocabulary scores. Linear regression revealed that monolingual vs. bilingual exposure was not associated with differences in vocabulary production. We also confirmed the association between age and vocabulary production. We argue that these findings suggest that, in our cohort of at-risk children, bilingual exposure does not negatively affect early expressive language development.

As a group, the participant's verbal outcome measures confirmed their delayed language development. The average percentiles for English and English+Non-English vocabulary were both in the lowest quartile (Table 1). However, the cohort's average nonverbal percentile closely approached the standardized mean, suggesting that the participants' delays affected language more than global cognitive development. The raw vocabulary size was on average greater in English (mean=95 words) than in Non-English (mean=25 words). This difference suggests that in general our cohort remained fairly English-dominant, perhaps reflecting the importance of overall social linguistic environment in driving early language development even in bilingual families. Figure 1 illustrates that the overall trend of total vocabulary raw scores vs. age follows the expected patterns of development. Further, the correlations between nonverbal raw scores and both English and English+Non-English raw scores attained significance. However, the correlation between nonverbal and Non-English raw scores did not (Table 2). Group differences between monolingual and bilingual participants did not attain statistical significance (Table 1). Moreover, post-hoc calculations determined that at least 70 participants are needed to detect what we argue is a clinically significant difference in total vocabulary (English+Non-English) raw score of one-half

standard deviation. Therefore, we argue that our study was adequately powered to detect clinically significant differences in our principal outcome measure, expressive vocabulary production.

In Study 2 we found many of the same correlations as in Study 1 and we can make similar claims that bilingual exposure is not associated with differences in vocabulary production in a sample of 12- to 72-month olds with ASD. However, because of the small sample size, this study is not adequately powered to identify significant differences between the two groups within this population. The raw vocabulary size was on average greater in English (mean=198 words) than in Non-English (mean=14words). This again suggests that this group as a whole is reasonably English-dominant. Children with ASD are also frequently receiving therapies that are conducted solely in English, which may have a strong influence on their English vocabularies even if they are in a bilingual environment at home. If this study is to be continued, it may also be necessary to have stricter inclusion criteria, especially since children with ASD have varying levels of language capabilities. A significant number of children with ASD remain nonverbal; in this study alone, 29% of the monolingual and 20% of the bilingual children lacked expressive vocabularies. In a larger study it would be logical to only include children with expressive language abilities since that is the principal outcome measure.

Our findings in both the premature and autistic populations call into question the clinical practice of recommending that these children be exposed to only one language. Given the social and practical difficulties that this recommendation may pose to families, the lack of evidence supporting a detrimental effect of bilingual exposure compels clinicians to reexamine whether limiting exposure to one language is an appropriate method of facilitating early language development in at-risk children.

In conclusion, monolingual vs. bilingual exposure was not associated with differences in expressive vocabulary in a sample of 12- to 36 month olds born preterm. The results are similar for a sample of 12- to 72 month old children with ASD; however, this study was limited by the small sample size. These findings suggest that bilingual exposure may not negatively affect early language development in children born premature and in children with ASD. Future studies will further quantify the relationships between amount of English vs. Non-English exposure and expressive vocabulary development. Understanding these relationships is fundamental to developing evidence-based strategies to facilitate early language in these two clinically significant populations.

REFERENCES

1. 2005-2007 American Community Survey. In: Bureau USC, ed; 2005.
2. Bartak, L., Rutter, M., & Cox, A. (1975). A comparative study of infantile autism and specific developmental receptive language disorder. *The British Journal of Psychiatry, 126*, 127-145.
3. Bertrand, J., Mars, A., Boyle, C., Bove, F., Yeargin-Allsopp, M., & Decoufle, P. (2001). Prevalence of autism in a united states population: The brick township, new jersey, investigation. *Pediatrics, 108*, 1155-1161.
4. Bialystok E. Cognitive Complexity and Attentional Control in the Bilingual Mind. *Child Dev.* 1999;70(3):636-644.
5. Bialystok E. *Bilingualism in development: language, literacy and development*. Cambridge, England: Cambridge University Press; 2001.
6. Bird EK, Cleave P, Trudeau N, Thordardottir E, Sutton A, Thorpe A. The language abilities of bilingual children with Down syndrome. *Am J Speech Lang Pathol.* Aug 2005;14(3):187-199.
7. Carlson SM, Meltzoff AN. Bilingual experience and executive functioning in young children. *Dev Sci.* Mar 2008;11(2):282-298.
8. Cruzado-Guerrero JR, Carta JJ. Assessing Vocabulary and the Bilingual Environment in Young Latino Children. *Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse Populations.* 2006;13(1):8-13.
9. De Houwer A. Two or More Languages in Early Childhood: Some General Points and Practical Recommendations. *ERIC Clearinghouse on Languages and Linguistics.* 1999.
10. Fombonne, E. (2003). The prevalence of autism. *Journal of the American Medical Association, 289*, 87-89.
11. Foster-Cohen S, Edgin JO, Champion PR, Woodward LJ. Early delayed language development in very preterm infants: evidence from the MacArthur-Bates CDI. *J Child Lang.* Aug 2007;34(3):655-675.
12. Hambly, C., & Fombonne, E. (2011). The impact of bilingual environment on language development in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 42:1342-1352
13. Kjelgaard, M., & Tager-Flusberg, H. (2001). An investigation of language impairment in autism: Implications for genetic subgroups. *Language and Cognitive Processes, 16*, 287-308.
14. Li P. Language History Questionnaire: A Web-Based Interface for Bilingual Research. *Behavior Research Methods.* 2006;38(2):202-210.
15. Lim VP, Lincoln M, Chan YH, Onslow M. Stuttering in English-Mandarin bilingual speakers: the influence of language dominance on stuttering severity. J Speech Lang Hear Res. 2008
16. MacArthur-Bates Communicative Development Inventories. http://www.sci.sdsu.edu/cdi/, 2007.
17. Marin G, Sabogal F, Marin BV, Otero-Sabogal R, Perez-Stable EJ. Development of a Short Acculturation Scale for Hispanics. *Hispanic Journal of Behavioral Sciences.* 1987;9(2):183-205.
18. Paradis J, Crago M, Genesee F, Rice M. French-English bilingual children with SLI: how do they compare with their monolingual peers? *J Speech Lang Hear Res.* Feb 2003;46(1):113-127.

19. Prathanee B, Thinkhamrop B, Dechongkit S. Factors associated with specific language impairment and later language development during early life: a literature review. *Clin Pediatr (Phila).* Jan 2007;46(1):22-29.\
20. Saigal S, den Ouden L, Wolke D, et al. School-age outcomes in children who were extremely low birth weight from four international population-based cohorts. *Pediatrics.* Oct 2003;112(4):943-950.
21. Salameh EK, Hakansson G, Nettelbladt U. Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *Int J Lang Commun Disord.* Jan-Mar 2004;39(1):65-90.
22. Sheng L, McGregor KK, Marian V. Lexical-semantic organization in bilingual children: evidence from a repeated word association task. *J Speech Lang Hear Res.* Jun 2006;49(3):572-587.
23. Shonkoff JP. Language Delay: Late Talking to Communication Disorder. In: Rudolph AM, Rudolph CD, eds. *Rudolph's Pediatrics, Twenty-First Edition*. Twenty One ed. ew York: McGraw-Hill; 2003:441-444.
24. Tager-Flusberg, H., Calkins, S., Nolin, T., Baumberger, T., Anderson, M. & Chadwick-Dias, A. (1990). A longitudinal study of language acquisition in autistic and Down syndrome children. *Journal of Autism and Developmental Disorders, 20,* 1-21.
25. Toppelberg CO, Snow CE, Tager-Flusberg H. Severe developmental disorders and bilingualism. *J Am Acad Child Adolesc Psychiatry.* Sep 1999;38(9):1197-1199.
26. Vohr BR, Allan WC, Westerveld M, et al. School-age outcomes of very low birth weight infants in the indomethacin intraventricular hemorrhage prevention trial. *Pediatrics.* Apr 2003;111(4 Pt 1):e340-346.
27. Volpe JJ. *Neurology of the Newborn*. Philadelphia: WB Saunders; 2001.
28. Walch, E., Chaudhary, T., Herold, B., & Obladen, M. (2009). Parental bilingualism is associated with slower cognitive development in very low birth weight infants. *Early Human Development, 85*(7), 449-454.
29. Westman M, Korkman M, Mickos A, Byring R. Language profiles of monolingual and bilingual Finnish preschool children at risk for language impairment. *Int J Lang Commun Disord.* Nov-Dec 2008;43(6):699-711.

Table 1: Study 1- Average Age, Gestational Age, Nonverbal and Verbal Communication Data for Overall Cohort, Monolingual and Bilingual HRIF Children. ()=Standard Deviation

	Range	Monolingual Mean (n=34)	Bilingual Mean (n=46)	p-value
Age (months)	12.0 - 36.0	19.6 (5.04)	21.2 (7.01)	0.222
Gestational Age (weeks)	23 - 39	30.7 (4.16)	31.2 (4.41)	0.607
Acculturation Score	0 - 50	49.3 (1.44)	34.1 (8.53)	**0.001**
Mean Parental Education Score	0 - 3	2.37 (0.847)	2.10 (0.975)	0.200
English Vocabulary Raw	0 - 582	99.9 (172.9)	91.6 (125.7)	0.804
Non-English Vocabulary Raw	0 - 588	0.00 (0.00)	45.7 (102.3)	**0.001**
Gender		male: 19 female: 15	male: 23 female: 23	0.602

Table 2: Study 1 – Correlations between Gestational Age, Nonverbal, and Verbal Communication Raw Scores while Controlling for the Effect of Age in HRIF Children

		Nonverbal Raw Score	English Vocabulary Raw Score	Non-English Vocabulary Raw Score	English+NonEnglish Vocabulary Raw Score
Gestational Age	rho	-0.009	-0.104	-0.131	-0.158
	p-value	0.953	0.501	0.398	0.305
Nonverbal Raw Score	rho		**0.575**	0.277	**0.638**
	p-value		**0.001**	0.072	**0.001**
English Vocabulary Raw Score	rho			-0.011	**0.846**
	p-value			0.945	**0.001**
Non-English Vocabulary Raw Score	rho				**0.523**
	p-value				**0.001**

Figure 1: Study 1 – The Relationship between Total Vocabulary (English+Non-English) Raw Scores and Age in HRIF Children

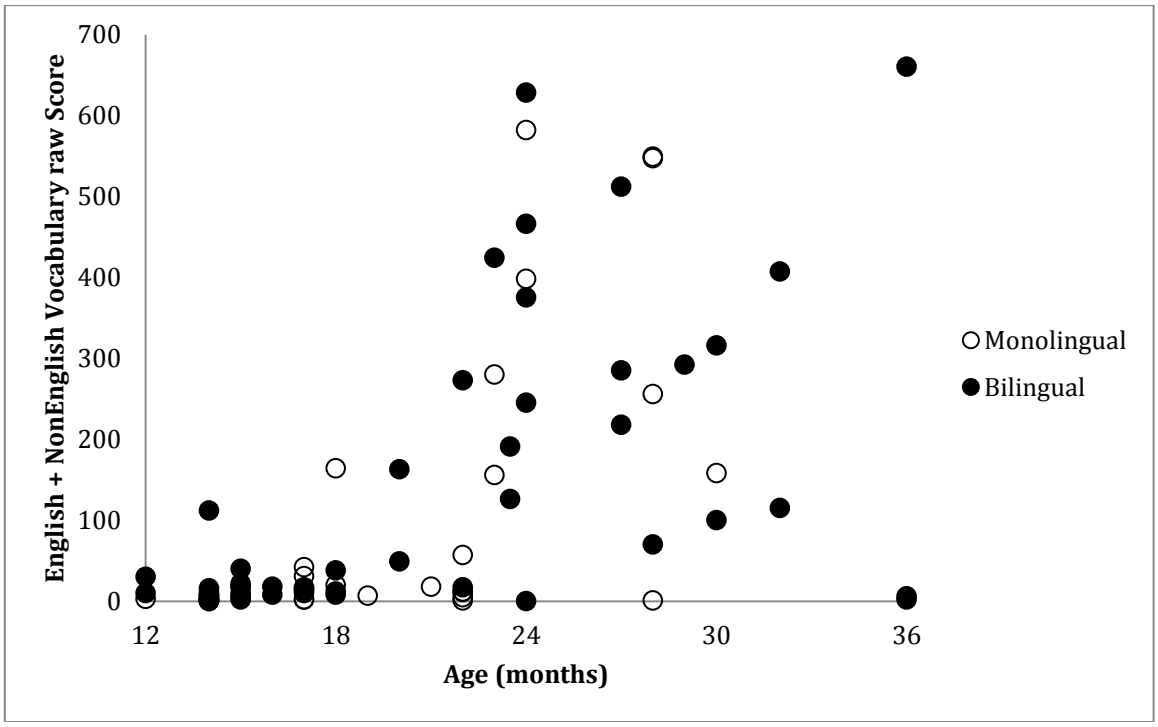


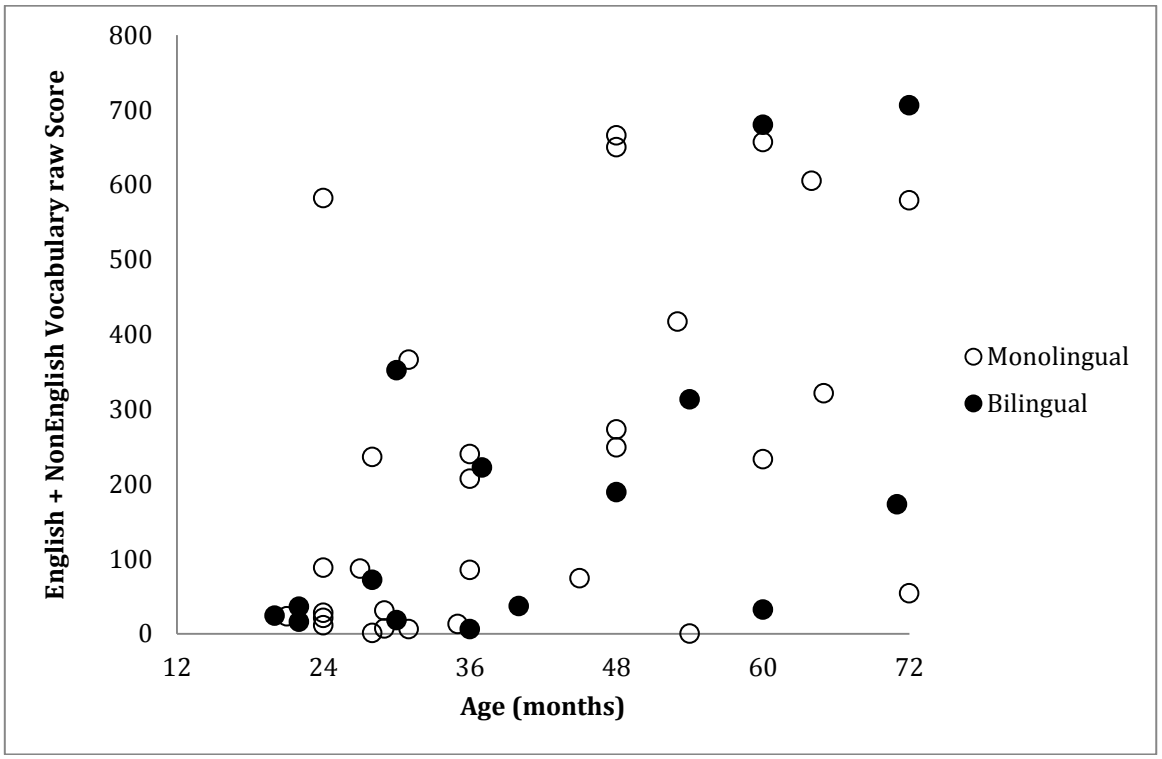
Table 3: Study 2 - Average Age, Gestational Age, Nonverbal and Verbal Communication Data for Overall Cohort, Monolingual and Bilingual ASD Children. ()=Standard Deviation

	Range	Monolingual Mean (n=31)	Bilingual Mean (n=15)	p-value
Age (months)	12.0 - 72.0	40.52 (15.6)	42.0 (17.7)	0.222
Gestational Age (weeks)	28-42	37.5 (3.37)	35.9 (3.27)	0.117
Acculturation Score	0 - 50	46.9 (11.7)	37.1 (10.4)	**0.009**
Mean Parental Education Score	0 - 3	2.48 (0.80)	2.53 (0.74)	0.842
English Vocabulary Raw	0 - 680	221.1 (231.8)	170.9 (227.5)	0.493
Non-English Vocabulary Raw	0 - 370	0.00 (0.00)	45.5 (97.8)	0.094
Gender		male: 25 female: 6	male: 9 female: 6	0.135

Table 4: Study 2 - Correlations between Gestational Age, Nonverbal, and Verbal Communication Raw Scores while Controlling for the Effect of Age in ASD Children

		Nonverbal Raw Score	English Vocabulary Raw Score	Non-English Vocabulary Raw Score	English+NonEnglish Vocabulary Raw Score
Gestational Age	rho	-0.084	0.190	-0.016	0.234
	p-value	0.582	0.210	0.916	0.127
Nonverbal Raw Score	rho		**0.549**	*0.294*	**0.539**
	p-value		**0.001**	*0.050*	**0.001**
English Vocabulary Raw Score	rho			0.167	**0.992**
	p-value			0.272	**0.001**
Non-English Vocabulary Raw Score	rho				-0.053
	p-value				0.733

Figure 2: Study 2 – The Relationship between Total Vocabulary (English+Non-English) Raw Scores and Age in ASD Children



Appendix 1: Parent Questionnaire

STANFORD UNIVERSITY - Research Questionnaire
Protocol Title: Patterns of Language Learning in Children Under 3 Years of Age
Protocol Director: Heidi Feldman MD, PhD

PATTERNS OF LANGUAGE LEARNING IN CHILDREN UNDER THREE YEARS OF AGE

-PARENTAL QUESTIONNAIRE-

Dear Participant,

Thank you for completing this questionnaire. Your information will help us better understand how young children learn different languages and improve how we promote children's healthy growth. Thank you!

Sincerely,

Heidi Feldman MD, PhD
Department of Pediatrics
Lucile Packard Children's Hospital
Stanford University

James Andrews BS, BA
MD Candidate
Stanford University School of Medicine
Stanford University

Is it alright for the research study staff to contact you about your answers to this questionnaire? (please choose ONE)

(Yes) (No, thank you)

1.) BACKGROUND INFORMATION

Please complete the following general questions.

Your Child's Age:

_____

Your Child's Sex:

_____

At how many weeks into the pregnancy was your child born?:

_____

How many older siblings does your child have?:

_____

How many younger siblings does your child have?:

_____

How many children total live in your home?:

_____

Does your child receive any early intervention services? If so, which ones?:

_____

What is the highest level of education completed by the child's mother?:

_____

What is the highest level of education completed by the child's father?:

_____

What is the occupation of the child's mother?:

_____

What is the occupation of the child's father?:

_____

Does your child have Private Health Insurance, Medicaid, or No Health Insurance?:

_____

In which Zip Code does your child live?:

_____

Does anyone in your child's family have a history of:

Autism or Autism Spectrum Disorder?
Reading Difficulties? Yes No
Speech Therapy? Yes No
Special Education? Yes No

2.) LANGUAGE BEHAVIOR INVENTORY

Please complete the attached pages (the black-and-white Xerox photocopies) which ask about your child's current language use.

3.) FAMILY LANGUAGE BACKGROUND AND LANGUAGE DIARY

PART A

The following questions ask about the languages that that YOU speak and how YOU learned these languages

1. What is the first language that YOU learned to speak?:

_____

2. What language other than English do YOU speak?:

_____

3. In which country were YOU born?:

_____

4. At what age were YOU first exposed to English?:

_____

5. How would you rate YOUR knowledge of English?
(choose ONE choice from 1 through 5)

1	2	3	4	5
No Knowledge		Able to Speak, But More Comfortable in Another Language		Completely Fluent, Native Speaker

6. How would you rate YOUR knowledge of the other language (Non-English) that you speak?
(choose ONE choice from 1 through 5)

1	2	3	4	5
No Knowledge		Able to Speak, But More Comfortable in Another Language		Completely Fluent, Native Speaker

7. When you are speaking, do you ever mix words or sentences in English and the other language (Non-English) that you speak? Yes No

8. Is there anything else you would like to tell us about your language background?

9. Please list each person who lives in the home with your child. For each person, please also list the person's relationship TO YOUR CHILD, the person's age, and the percent of the time that the person speaks ENGLISH in the home.

Person	Relationship	Age	% in English

PART B:

The following questions ask about how YOU use English and the other language that you speak (Non-English). Please choose ONE choice (from 1 through 5) for the following questions:

1. In general, what language(s) do you read and speak?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

2. What was the language(s) you used as a child (before you started going to school)?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

3. What language(s) do you usually speak at home?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

4. In which language(s) do you usually think?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

5. What language(s) do you usually speak with your friends?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

6. In what language(s) are the T.V. programs you usually watch?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

7. In what language(s) are the radio programs you usually listen to?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

8. In general, in what language(s) are the movies, T.V. and radio programs you *prefer* to watch and listen to?

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

9. Your close friends speak:

1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

10. The persons you visit or who visit you speak:

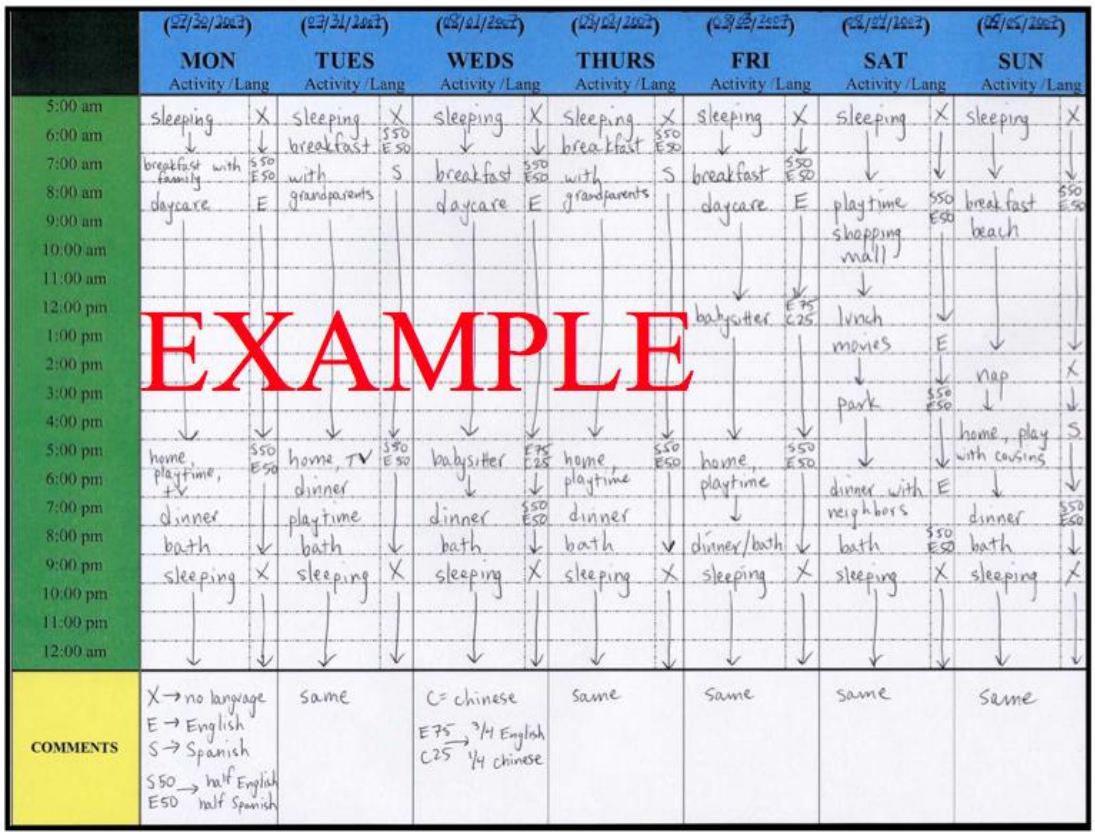
1	2	3	4	5
Only Non-English	Non-English better than English	Both Equally	English better than Non-English	Only English

PART C
Please complete the following table for one week (seven days) by filling in the activities that your child does each day AND the language or languages spoken during the activity. We have included an example to help you.

Is this a typical week for your child? Yes or No
If not, please explain:

STANFORD UNIVERSITY - Research Questionnaire

Protocol Title: Patterns of Language Learning in Children Under 3 Years of Age
Protocol Director: Heidi Feldman MD, PhD



STANFORD UNIVERSITY - Research Questionnaire

Protocol Title: Patterns of Language Learning in Children Under 3 Years of Age
Protocol Director: Heidi Feldman MD, PhD

	(--/--/----) MON Activity /Lang	(--/--/----) TUES Activity /Lang	(--/--/----) WEDS Activity /Lang	(--/--/----) THURS Activity /Lang	(--/--/----) FRI Activity /Lang	(--/--/----) SAT Activity /Lang	(--/--/----) SUN Activity /Lang
5:00 am							
6:00 am							
7:00 am							
8:00 am							
9:00 am							
10:00 am							
11:00 am							
12:00 pm							
1:00 pm							
2:00 pm							
3:00 pm							
4:00 pm							
5:00 pm							
6:00 pm							
7:00 pm							
8:00 pm							
9:00 pm							
10:00 pm							
11:00 pm							
12:00 am							
COMMENTS							