Noun versus Verb Bias in Mandarin-English Bilingual Pre-School Children

TESOL Journal
Vol. 3, pp. 29-48
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Abstract

This study investigated the presence of noun or verb bias in 15 Mandarin-English bilingual pre-school children. The naturalistic bilingual child-caregiver interactions were tape-recorded for 30 minutes each time. The study also addressed the relationship between children's language production and the salient positions of the caregivers' language input. The findings show that the bilingual children exhibit a noun bias in their English vocabularies and a verb bias in their Mandarin words. However, more verbs were significantly produced in children's Mandarin production as compared to those in English language. In order to determine if there is a correlation between salient positions of nouns and verbs in bilingual caregivers' language and children's language production of nouns and verbs, a Two-Way Analysis of Variance was used. The results suggest that such hypothesized correlation does exist. Specifically, in Mandarin, caregivers' frequency of nouns in the final position of utterances seemed to influence the noun bias displayed in bilinguals' early lexicons. In English, the frequency of nouns in the final position of caregivers' language input was a robust variable, which was most likely to predict the noun bias manifested in bilingual children's early vocabularies.

Keywords: noun bias, verb bias, bilingual children, salient positions, correlation

Introduction

This paper examined the presence of noun or verb bias in Mandarin-English bilingual pre-school children in the Philippine context. The naturalistic interactions between 15 Mandarin-English bilinguals and their bilingual caregivers were tape-recorded for 30 minutes each time. The study showed that more verbs were significantly produced in children's Mandarin production and that the correlation between children's language production and the salient positions of the caregivers' language input with regard to nouns and verbs was found. The study addressed four research questions: (1) Do Mandarin-English bilingual preschool children produce more verbs than nouns? (2) Do they

produce more verbs than nouns in both Mandarin and English? (3) Do the salient positions of nouns or verbs in the caregivers' input influence the bilingual children's production of nouns and verbs? (4) Is the influence of caregivers' input the same with Mandarin nouns and verbs and English nouns and verbs?

One of the debates on children's lexical studies is to examine whether they exhibit a universal "noun bias" when learning a language. Such universality of a noun-dominated early vocabulary was termed as "noun bias" (Tardif, 1996, p. 494). Past research on this topic has provided a large body of evidence supporting this lexical bias (Nelson, 1973, cited in Hoff, 2001; Gentner 1978, cited in Hoff, 2001; Benedict, 1979, cited in De Boysson-Bardies, 1999; and Bates, et al., 1983, cited in De Boysson-Bardies, 1999; Goldfield, 1993, cited in Tardif et al., 1997; Nelson, et al., 1993, cited in De Boysson-Bardies, 1999). However, "noun bias" had been questioned ever since. Some researchers argue that "verb bias" dominates children's early vocabularies in English (Bloom et al. 1993, cited in Hoff, 2001; Fernald & Morikawa, 1993, cited in Hoff, 2001), Korean (Gopnik & Choi, 1995, cited in Hoff, 2001), and Mandarin (Tardif, 1993, cited in Tardif, 1996; Tardif, 1996; Tardif, Shatz, & Naigles, 1997; Tardif et al., 1999).

Obviously, lexical bias in children's early words has been well documented so far. What has been studied is monolingual children's lexical development. Tardif (1996) reexamined this noun bias universality by conducting a research among ten 22-month-old monolingual Mandarin-speaking children, who were recorded while talking to their caregivers at home. Another study was conducted by Camaioni and Longobardi (2001), who recorded the naturalistic interaction between Italian adults and their children to test the verb bias hypothesis since Italian is a pro-drop language, which allows syntactic subjects to be omitted. Fifteen monolingual Italian-speaking mothers and their children took part in the study. Each 45-minute audio-video recorded session entailed three contexts: play with familiar toys, play with new toys, and meal time. They concluded that Italian mothers produced more verb types and tokens and placed verbs more frequently in salient utterance positions, they also posited that children's actual verb-biased input predicted their verb-oriented pattern of acquisition.

Still, other monolingual studies investigated the lexical bias cross-linguistically. Tardif, Shatz, and Naigles (1997) recorded naturalistic interactions between the caregivers and toddlers in their homes from three languages: English, Italian, and Mandarin. For the English data, six children from a larger sample of 63 mother-child dyads from Wisconsin were included. The Italian data came from the Calambrone corpus and included recorded interactions between six children and their caregivers in their Pisa homes. The study concluded that variations in the input were consistent with children's spontaneous production, to be specific, the English-speaking caregivers highlighted nouns, the Mandarin-speaking counterparts emphasized verbs, and the Italian monolingual caregivers showed an uncertainty.

Tardif, Gelman, and Xu (1999) compared English and Mandarin 20-month toddlers. This study highlighted the role of activity context. Based on the analysis and discussion, they concluded that nouns prevailed in book reading, but they did not show dominance in toy play. Given all these research, it can be concluded that the "noun bias" hypothesis is subject to many factors, such as the sampling methods and the context wherein the experiments are taking place.

However, studies of lexical bias on bilingual children are few, and nonexistent among Mandarin-Enlish bilinguals. The lexical bias in the early lexical development has also gained recognition in the area of bilingual language development. By "bilingual," Hangen (1953) posited that it begins at the point where a speaker of one language can produce complete, meaningful utterances in the other (Editorial work by Anthony Liddicoat Research and Publications Officer, 1991). Lucas and Bernardo (2008) pioneered an updated way to view the "noun bias" among bilingual children in the Philippine setting. Lucas and Bernardo (2008) highlighted the importance of nouns for children, "nouns are important linguistic blocks of learning, and the development of other parts of speech may greatly depend on the young language learner's acquisition and production of these lexical categories in the initial phase of language acquisition." (p. 149). Sixty Filipino-English bilingual pre-school children and their caregivers constituted the participants, with 30 coming from each gender. Their ages ranged from 3 to 3.92 years. They reached the conclusion that the noun bias was solely obvious in bilingual children's English production rather than in their Filipino utterances. In English, the noun bias displayed in children's early vocabularies was found to be associated with the frequency of nouns in the caregivers' language input and with the initial positions of nouns of the caregivers' utterances.

Method

This section specifies the design and the methodology of the present study. The study made use of both quantitative and descriptive design. The researcher used the recordings of "naturalistic interactions" as the research technique since among the three generally used research techniques (the other two being caregivers' diaries and the checklist measure of vocabulary such as the MacArthur Communicative Development Inventory [CDI]), this technique was more representative of language features of speech produced by children and their caregivers. Additionally, it was more feasible for the researcher to use this technique in conducting the study.

Language Context

According to Ang-Sy (1997), the Chinese in the Philippines occupy roughly 1.3% of the total Philippine population. Although Fookien is still the lingua franca of the Chinese community because 85% of the Chinese immigrants come from Fujian province, their first language is no longer Fookien

but the local Filipino language or English. The use of Fookien is largely confined to the older generation and the business community. However, the number of preschool children who already know Fookien is very limited; Mandarin is the medium of Chinese-language instruction in most Chinese schools. Therefore, children who reside in the Chinese communities in the Philippines but are educated in the Mandarin language tend to be Mandarin-English bilinguals. The Chinese community in the Philippines constitutes the backdrop of the present study.

Participants

Fifteen Mandarin-English bilingual children (10 girls, 5 boys) were recruited from three medium classes of the kindergarten section of the Philippine Cultural College for the recordings of their naturalistic interactions with their caregivers; each session lasted for around 30 minutes. The age ranged from 5 to 6 years old (M = 5.25 years, SD = 0.32 years). The children were admitted by their teachers as good speakers in both Mandarin and English. All the children were first born and had middle socioeconomic status (SES). Caregivers are two Chinese graduate students studying at De La Salle University-Manila. They are Mandarin-English bilinguals, proficient in Mandarin and English. Therefore, they met the criteria to be caregivers in terms of language proficiency.

Procedure

Permission and assistance were asked from the Principal of the Philippine Cultural College and Kinder / Nursery Supervisor of the school before the recordings. The school library was finally selected as a proper location to generate clear recordings of the participants. Before each recording session, the research purposes were made known, and the instructions were followed to guarantee effective recordings. Additionally, nicknames or pseudonyms were used to protect participants' privacy or to make them feel comfortable. During the recordings, they were allowed to talk about any interesting topics based on children's picture books, which the researcher prepared in advance.

The recorded audio files were saved for analysis. Afterwards, the voice files were transcribed by the researcher. The transcripts followed the transcription conventions devised by Cameron and Coates (1998, cited in Coates, 1998), the following variables were analyzed: (1) the frequency of nouns and verbs in children's language production; (2) the frequency of nouns and verbs in children's Mandarin and English language; and (3) the correlation between caregivers' salient positions of nouns and verbs in Mandarin, and English and children's nouns and verbs production in Mandarin and English. Finally, a doctoral graduate student studying at De La Salle University-Manila

was invited as the inter-rater to countercheck the transcripts of the present study.

Coding

After the recordings, the data were transcribed. The Mandarin utterances were underlined and translated into English. The researcher coded every single word as it appeared in an utterance. Repetitive words or words from a song or poem were exempted from the analyses. The transcription conventions devised by Cameron and Coates (1998) employed in the present study (Cameron & Coates, 1998, cited in Coates, 1998, p.xx, see the Appendix 1) .

Data Analysis

This section is about how the data were analyzed in detail, for instance, in the present study, how nouns and verbs were defined in Mandarin and English, how the frequency and salient positions were analyzed specifically, and what statistical methods were used.

This part includes four topics: (1) how nouns and verbs were defined in Mandarin; (2) how nouns and verbs were defined in English; (3) analysis of the frequency of nouns and verbs; and (4) analysis of salient positions of nouns and verbs.

How nouns and verbs were defined in Mandarin in the present study. With some modifications, the present study used the definitions of nouns and verbs in Tardif's (1996) study. The definitions of Mandarin nouns and verbs that were used in the present study were summed up in what follows:

Definitions of Mandarin nouns used in the present study. a) Common Nouns, such as "niao"(bird); b) Proper Nouns, such as "Xianggang"(Hong Kong); and c) Pronouns, "this" and "that" used pronominally, such as "Wo jingchang qu gongyuan, wo xihuan *na li.*"(I always go to park, I like *there*.)

Definitions of Mandarin Verbs used in the present study. a) Main Verbs, such as "*He shui*"(Drink water); b) Qualitative Verbs, such as "Wo *xihuan* zhe fu hua" (I like this picture); c) Classificatory Verbs, such as "Wo *xing* wang" (My last name is wang); d) Copula "Shi", such as "Wo *shi* xuesheng" (I am a student); e) Verb "You", such as "Wo *you* henduo wanju" (I have lots of toys); f) Stative Verbs, such as "Da huilang *shui zhao le*"(The wolf *is asleep*); g) Adjectives, such as "Tian *hei le*" (It is dark); and h) Nouns, such as "Wo *liusui*" (I *am six years old*).

How nouns and verbs were defined in the English data of the present study. A **noun** is a word or word group that names a person, a place, an idea, or a thing (object, activity, quality, condition). When it is used to label a particular person or object, it is said to be a ***proper noun***; for example, *Catharine*, *New York*; when it labels someone or something in a general way, it is a ***common noun***, for instance, *boy* and *country* (LaPalombara, 1976).

A **verb** is a word or word group that expresses action, condition, or state of being. It may be a single word or it may be preceded by one or more auxiliary words. It may also be particles. The verb function is referred to as **prediction**. A verb is either **intransitive,** which requires no words to complete its meaning, for example, "The new term *starts*;" **transitive,** which requires a direct object to complete its meaning, for example, "He *caught* the ball;" or **linking,** which links the subject to a nominal or an adjective in the predicate, for example, "Jane *is* a passionate speaker" (LaPalombara, 1976).

Frequency of nouns and verbs. Based on the definitions of nouns and verbs in Mandarin and English discussed above, nouns and verbs categories were counted by using the table below to investigate the lexical bias manifested in the development of early vocabularies of Mandarin-English bilingual preschool children. The frequency of nouns and verbs was counted in Mandarin and English respectively to identify in which language nouns and verbs were more prevalent in lexicons of Mandarin-English bilinguals.

Salient positions of nouns and verbs. Caregivers' nouns and verbs that appeared in the initial position and final position of English and Mandarin utterances were counted. This tabulation was designed to find out whether the salient positions of caregivers' language input of nouns and verbs would result in the noun or verb bias in children's language production.

Regarding sentence salient positions, following Tardif et al.'s (1997) method, the lexicons were to be coded as "initial" position if they are located at the beginning of utterances and as "final" position if they are located in the end of utterances. Take the following Mandarin and English utterances for example:

Example 1 (Mandarin utterances):
Caregiver: Xi huan yingyu ma? *(Mandarin)*
(Do you like English?) (English translation)
Child: Xi huan. *(Mandarin)*
(*Yes, I do.) (English translation)*

Example 2 (English utterances):
Caregiver: What do you like to do?
Children: Reading.

In caregiver's Mandarin utterance, "*Xihuan*" (Like) was located at the beginning of the utterance, therefore, it was tabulated in "MANDARIN-Initial position-VERBS;" because "*yingyu*" (English) was located at the end of the Mandarin utterances, it was tabulated in "MANDARIN-Final position-NOUNS." In caregiver's English utterance, "do" was located in the end of an utterance, so, it was tabulated in "ENGLISH-Final position-VERBS."

The present study employed the word "utterance" as the unit to analyze the salient positions of nouns and verbs as they appeared in the naturalistic interactions between the bilingual preschool children and their bilingual caregivers. An utterance is "a unit into which the stream of speech could be separated intonationally" (Crookes & Rulon, 1985). It is a stream of speech with at least one of the following characteristics: (1) under one intonation contour; (2) bounded by pauses; and (3) constituting a single semantic unit. "Utterance" was used as an analysis unit because it met the following two criteria of utterance: One is the "reliability," the other is the "validity."

Statistical Treatment

To answer whether bilingual Mandarin-English preschool children will produce more verbs than nouns in their interaction with their bilingual caregivers, mean scores and standard deviations of nouns and verbs in all the data were computed respectively and compared. As for the lexical dominance in each language, the *t*-test was used to test the difference between Mandarin and English on the nouns and verbs children and their caregivers used in their conversation. In order to further trace whether children's lexical bias follows the same pattern as that of their caregivers, the mean scores were compared to each other under the category of noun and verb. With regard to the question whether children's language production of nouns and verbs in initial and final positions across mandarin and English was influenced by their caregivers' salient positions of language production, mean scores and percentage of both children and caregivers in every salience (initial Mandarin, final Mandarin, initial English and final English) were tabulated and compared, then a Two-Way Analysis of Variance was employed to test the possible correlation between caregivers' salience of nouns and verbs and children's language production in both languages.

Results

This section statistically explores the research questions from the following three facets: (1) comparison between verbs and nouns that children and their caregivers used in the interactions; (2) difference between Mandarin and English on the nouns and verbs in bilingual children's utterances; and (3) the correlation between the salient positions of caregivers' language input and the noun or verb bias in bilingual children's language production.

Difference between Verbs and Nouns for Children and Caregivers

To answer the first research question, mean scores and standard deviations were computed and compared for nouns (*M* = 72.27) and verbs (*M* = 70.07) in overall data. Results revealed that the number of nouns and verbs Mandarin-English bilingual preschool children produced in the interactions had almost the same frequency; the number of nouns was only slightly higher than that of verbs. This noun prevalence in children's language production was consistent with a noun bias in the caregivers' language input, which manifested an average of 311.93 nouns and 304.87 verbs. This seems to suggest that nouns are more prevalent in children's and caregivers' discourse. Children's presence of noun bias seemed to be compatible with the noun bias in caregivers' language input. However, children's nouns and verbs are not significantly different.

Table 1
A Comparison of Mean Scores and Standard deviations of nouns and verbs in overall data between children and caregivers

	Children		Caregivers	
	M	*SD*	*M*	*SD*
Nouns	72.27	46.54	311.93	53.28
Verbs	70.07	46.39	304.87	57.30

The *t*-test for two dependent samples was used to further test the difference between the nouns and verbs bilingual preschool children produced, $N = 15$, $df = 14$, $p = 0.841$. Marked differences are significant at $p < .05$; therefore, the conclusion was that there is no significant difference in the number of nouns and verbs produced by the children. In other words, Mandarin-English bilingual five-year-olds seemed not to display an apparent noun bias. Mean scores were identical for children's nouns and verbs.

Do the bilingual children produce more verbs than nouns in both Mandarin and English? This question was explored in the next section.

Difference between Mandarin and English on the Nouns and Verbs of Bilingual Children Used

Verbs seemed to be more prevalent in the Mandarin language. The Mandarin-English bilingual children produced an average of 48.20 nouns (*SD* = 40.68), as compared to verbs (*M* = 58.20, *SD* = 44.76); however, in the English language, it seemed to be totally different: nouns dominated bilingual children's language production, for bilingual children produced an average of 24.70 nouns (*SD* = 21.12), as compared to verbs (*M* = 11.87, *SD* = 16.16). Therefore, it can be concluded that the presence of noun bias was found in the English discourse of the Mandarin-English bilinguals, and the existence of verb bias was apparent in their Mandarin discourse.

Table 2

The Difference between Mandarin and English on the Nouns and Verbs Bilingual Children Used

	M-m	*M*-e	*t*	*df*	*p*	*N*-m	*N*-e	*SD*-m	*SD*-e	*F* Variances	*p* Variances
N	48.20	24.07	2.04	28	0.0510	15	15	40.68	21.12	3.17	0.0197
V					0.0008	15	15	44.76	16.16	7.67	0.0005

The *t*-test for two independent samples was used to further test the difference between Mandarin and English on the nouns and verbs bilingual preschoolers used in the naturalistic interaction with their caregivers. Regarding nouns produced by children the result was $p = 0.051$ because marked differences are significant at $p < .05$, so, the results showed that there is no significant difference between Mandarin and English on the nouns children produced. However, when Mandarin and English were compared, the result was $p = 0.0008$, thus, more verbs were significantly produced for Mandarin (M =58.20) as compared to English (M=11.87).

Also, children's verb bias may be associated with their caregivers' lexical bias. To explore this possible relationship, the lexical dominance was compared between children and caregivers in the following table.

Table 3 presents a possible relationship between children and their caregivers. Results showed that children displayed noun bias in their English language production and manifested the verb bias in their Mandarin language production. This accorded with their caregivers' noun prevalence and verb dominance in their English and Mandarin languages input respectively. This suggested that Mandarin-English bilingual children's noun / verb bias may have been conditioned by their caregivers' language input, and there was a positive correlation between them.

Table 3

A Comparison of the Lexical Dominance between Children and Caregivers

	Children (*Mean*)		Caregivers (*Mean*)	
	Mandarin	English	Mandarin	English
Nouns	48.20	24.07	159.53	152.40
Verbs	58.20	11.87	179.53	125.33

However, apart from the caregivers' influence in terms of frequency, was it possible that the salient position of caregivers' input could be another factor influencing the noun / verb bias in children's language production? To test possible correlations, data were analyzed in detail from four sub-topics: initial Mandarin; final Mandarin; initial English; and final English, in order to give answers to research questions 3 and 4.

Salient Positions of Caregivers' Language Input Influencing the Noun versus Verb Bias in Children's Language Production

The present study attempted to explain the noun or verb bias, which appeared in the vocabularies of Mandarin-English bilingual preschool children by considering the interaction between caregivers' salient positions and children's noun versus verb bias. In doing so, mean scores and frequency of nouns and verbs in salient positions were compared between caregivers and children (see Table 4). A correlation between caregivers' salient positions and bilingual children's lexical bias was found. This seemed to suggest that the nouns and verbs on the salient positions of caregivers' language input may be an important factor, which causes the noun bias or verb bias in children's discourse.

Table 4

A Comparison of Mean scores (M) and Frequency (%) between Caregivers and Children in Terms of Salient Positions in Mandarin (m) and English (e)

	I m*		F m*		I e*		F e*	
	M	%	*M*	%	*M*	%	*M*	%
Caregivers Nouns	*30.60*	19.18	*50.80*	31.84	*17.40*	11.42	*46.60*	30.58
Caregivers Verbs	*24.47*	13.63	*36.60*	20.39	*12.47*	9.95	*18.60*	14.48
Children Nouns	*19.07*	39.56	*20.87*	43.29	*12.47*	51.80	*8.80*	36.57
Children Verbs	*20.87*	35.85	*13.40*	23.02	*2.00*	16.85	*2.73*	23.03

* I m: Initial Mandarin; F m: Final Mandarin; I e: Initial English; F e: Final English

A Two-Way Analysis of Variance was employed to test the possible correlation between caregivers' salience and children's language production, as can be seen in Table 5.

Table 5

Univariate Results for Salient Positions: Sigma-restricted Parameterization Effective Hypothesis Decomposition (overall data)

	Level of Factor	Level of Factor	N	I m*	I m	F m*	F m	I e*	I e	Fe*	F e
				M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Total			60	22.92	18.82	30.43	23.21	11.08	12.10	19.18	21.95
Influence	Caregiver		30	25.87	18.25	43.73	22.71	14.93	13.06	**32.60**	23.77
Influence	Child		30	19.97	19.22	17.13	14.62	7.23	9.82	**5.77**	6.54
Word	Nouns		30	24.83	16.48	35.83	25.07	14.93	14.67	**27.70**	26.08
Word	Verbs		30	21.00	20.99	25.03	20.17	7.23	7.20	**10.67**	12.26
Influence* word	Caregiver	Nouns	15	30.60	16.82	50.80	22.74	17.40	17.18	46.60	24.30
Influence* word	Caregiver	Verbs	15	21.13	18.94	36.67	21.08	12.47	6.73	18.60	12.67
Influence* word	Child	Nouns	15	19.07	14.44	20.87	17.46	12.47	11.72	8.80	7.26
Influence* word	Child	Verbs	15	20.87	23.55	13.40	10.40	2.00	1.89	2.73	4.01

* I m: Initial Mandarin; F m: Final Mandarin; I e: Initial English; F e: Final English

As Table 6 presents, a Two-Way Analysis of Variance was used to determine if children's nouns or verbs bias was influenced by caregivers' initial Mandarin words. The results indicated that the influence of the caregivers' salient position had no significant main effect on the frequency of children's Mandarin words. Nouns (*M* = 24.83) and verbs (*M* = 21.00) also did not significantly vary on the frequency of initial Mandarin words. Results suggested that the interaction between the influence caregivers' initial Mandarin position and children's lexical bias was not significant in this case.

Table 6

Univariate Results for Initial Mandarin: Sigma-restricted Parameterization Effective Hypothesis Decomposition

	df	I m* – SS*	I m – MS*	I m – *F*	I m - *p*
Intercept	1	31510.42	31510.42	89.72	0.00
Influence	1	522.15	522.15	1.49	0.23
Word	1	220.42	220.42	0.63	0.43
Influence* Word	1	476.02	476.02	1.36	0.25
Error	56	19668.00	351.21		
Total	59	20886.58			

* I m: Initial Mandarin; SS = Sum of Squares; MS = Mean Square

Then, a Two-Way Analysis of Variance was similarly used to determine if children's lexical bias was influenced by caregivers' salient position in the case of the final Mandarin words (see Table 7). The results indicated that the influence of the caregivers had a significant main effect on children's frequency of Mandarin words (mean scores of caregivers = 43.73, mean scores of the children = 17.13). Nouns (*M* = 35.83) and verbs (*M* = 25.03) significantly varied on the frequency of final Mandarin words. But the interaction between the caregivers' influence of salient position and children's lexical prevalence was not significant in this case.

Table 7

Univariate Results for Final Mandarin: Sigma-restricted Parameterization Effective Hypothesis Decomposition

	F m* – SS*	F m – MS*	F m – *F*	F m - *p*
Intercept	55571.27	55571.27	161.722	0.00
Influence	10613.40	10613.40	30.89	0.000001
Word	1749.60	1749.60	5.0916	0.027965
Influence* Word	166.67	166.67	0.4850	0.489037
Error	19243.07	343.63		
Total	31772.73			

* F m: Final Mandarin; SS = Sum of Squares; MS = Mean Square

In the same way, as can be seen from Table 8, a Two-Way Analysis of Variance was employed to determine if the noun or verb predominance across the language production of the Mandarin-English bilingual preschool children was influenced by caregivers' English vocabularies in the initial position. The results indicated that the influence of the caregivers had a significant main effect on the frequency of initial English words (mean scores of caregivers = 14.93, mean scores of the children = 7.23). Moreover, nouns (*M* = 14.93) and verbs (*M* = 7.23) significantly varied on the frequency of initial English words. Nevertheless, the interaction between the influence of caregivers' salient position and word bias on the frequency of initial English words that the Mandarin-English bilingual preschool children produced was not significant.

Table 8
Univariate Results for Initial English: Sigma-restricted Parameterization Effective Hypothesis Decomposition

	I e* – SS*	I e – MS*	I e – *F*	I e - *p*
Intercept	7370.42	7370.42	61.25	0.0000
Influence	889.35	889.35	7.39	0.0087
Word	889.35	889.35	7.39	0.0087
Influence* Word	114.82	114.82	0.95	0.3329
Error	6739.07	120.34		
Total	8632.58			

* I e: Initial English; SS = Sum of Squares; MS = Mean Square

A Two-Way Analysis of Variance was used to determine if the Mandarin-English bilingual preschool children's noun or verb bias was influenced by their bilingual caregivers' English words in the final position (see Table 9). The results indicated that the influence of the caregivers' salient positions did have a significant main effect on the frequency of English words of children's language production. Nouns (*M* = 27.70) and verbs (*M* = 10.67) also significantly varied on the frequency of final English words. There is a significant interaction between the influence of caregivers' final English position and word predominance of bilingual preschool children.

Table 9

Univariate Results for Final English: Sigma-restricted Parameterization Effective Hypothesis Decomposition

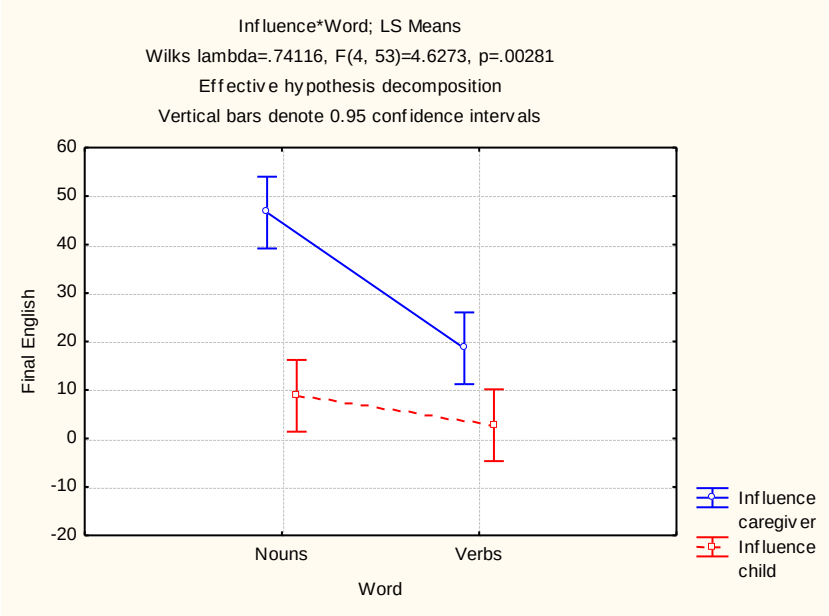
	F e* – SS*	F e – MS*	F e – *F*	F e - *p*
Intercept	22080.02	22080.02	107.76	0.0000
Influence	10800.42	10800.42	52.71	0.0000
Word	4352.02	4352.02	21.24	0.000024
Influence* Word	1804.02	1804.02	8.80	0.004414
Error	11474.53	204.90		
Total	28430.98			

* F m: Final Mandarin; SS = Sum of Squares; MS = Mean Square

As Figure 1 illustrates, the hypothesized correlation between the nouns and verbs of caregivers' final English words and children's lexical bias had been further verified. Results showed that more nouns were produced by Mandarin-English bilingual preschool children in the final English words. Children's noun prevalence had been more influenced by the caregivers' language input of nouns in the final English salient position. However, in the case of verbs, the correlation between caregivers' salient position and children's language production appeared to be weak.

Figure 1

Correlation between the nouns and verbs of caregivers' final English words and children's lexical bias



Discussion

Based on the findings, it was concluded that there is no significant difference in the number of children's production of nouns and verbs ($p > .05$) because the number of nouns and verbs Mandarin-English bilingual learners produced had the same frequency. According to hypothesis 1, it was expected that Mandarin-English bilingual preschool children will produce more verbs than nouns; such claim may be hypothesized from prior monolingual studies (Nelson, 1973, cited in Hoff, 2001; Gentner, 1982, cited in Hoff, 2001; Goldfield, 1993, cited in Tardif et al., 1997; Benedict, 1979, cited in De Boysson-Bardies, 1999). Because the meanings of nouns are much easier than verbs for children to understand, their early vocabularies tend to be noun biased. The results also suggested that caregivers' higher proportions of nouns in their interactions might contribute to the noun prevalence in the bilingual children's language production. This connection was also found previously, for example, Goldfield (1993) claimed that the correlation between parental noun types and those of children was significant (Goldfield, 1993, cited in Tardif, Shatz & Naigles, 1997, pp.540-541).

The question is why there is no significant difference in the number of children's production of nouns and verbs. One possible reason is that although the caregivers' language input manifested a slight noun bias across all data, an average of 311.93 for nouns and 304.87 for verbs, basically shows that the mean scores of nouns and those of verbs are very similar, this similarity in terms of frequency of caregivers' language input may result in an identical frequency of children's language production of nouns and verbs.

Another reason may be caused by the liberal method of counting nouns in the present study. Tardif (1996) noticed that monolingual Mandarin-speaking children produced more verbs than nouns when a conservative method of counting was employed; however, neither noun bias nor verb bias was found when a more liberal method of counting nouns was used.

The age of the Mandarin-English bilingual may also explain this language phenomenon. According to Gentner (1978, cited in Hoff, 2001), the relational meanings that verbs encode are less available to young children through nonlinguistic experience. After the production of children's first words, there occurs the word spurt. This vocabulary explosion happens for most children at the age of approximately 16 to 19 months (Benedict, 1979, cited in Bloom, 2002; Goldfield & Reznick, 1990, cited in Bloom, 2002; Nelson, 1973, cited in Bloom, 2002). When children become five years old, their language capacity may become matured enough to make sense of the relational meanings that verbs encode. The five-year-olds are able to use verbs much better, therefore, the noun bias may not be so apparent in their vocabularies.

In the language production of Mandarin-English bilingual children, verbs seemed to have a higher frequency in Mandarin language; conversely, in the case of English language, nouns seemed to be prevalent in bilingual

children's language production. The results supported previous studies on the conclusion that verb bias is shown in the early vocabularies of Mandarin children (Tardif, 1996; Tardif, Shatz, & Naigles, 1997; Tardif, Gelman, & Xu, 1999). In the English language, a number of studies, which recruited monolingual children, reported the noun bias in children's early lexicons (Nelson, 1973, cited in Hoff, 2001; Gentner, 1982, cited in Hoff, 2001; Goldfield, 1993, cited in Tardif et al., 1997; Benedict, 1979, cited in De Boysson-Bardies, 1999). Lucas and Bernardo (2008) studied the Filipino-English bilingual children; they reported that the noun bias was also obvious in these bilinguals' English language production. Replicating the previous results, the present study suggested that Mandarin-English bilingual children, in the same way, showed an apparent noun bias in their English vocabularies.

It was seen that children's noun bias in the English language and the verb bias in the Mandarin language, are consistent with their caregivers' lexical biases in their English and Mandarin language input respectively. Such accordance may result from the caregivers' and children's parallel frequencies of nouns and verbs to begin with. For bilingual children, the mean scores of Mandarin verbs were higher than that of Mandarin nouns; in the same way, the mean scores of English nouns were higher than that of English verbs. Moreover, their caregivers seemed to show an identical pattern in terms of frequency of nouns and verbs in both languages. This seemed to replicate Tardif et al.'s (1997) results, which reported that Mandarin-speaking caregivers emphasize verbs over nouns; caregivers' verb bias may also affect children's noun bias, which emerges from their language production.

A second possible explanation is that the syntactic feature of Mandarin language may lead to the verb bias, which displays in children's Mandarin language production. Grammar of Mandarin allows noun-dropping, for example, "*Zhidao* zhege gushi ma?" (verb was italicized). This Mandarin sentence may be stated in English, "*Know* this story?" (Word-for-word translation). Such syntactic feature tends to place verbs at a salient position in a sentence, thus making verbs occur more often in children's language production.

But, further results from *t*-test suggested that there is no significant difference between Mandarin and English on the nouns of children's production. However, more verbs were significantly produced for Mandarin as compared to English.

Regarding research questions 3 and 4, a Two-Way Analysis of Variance was used to determine if the salient positions of nouns or verbs in caregivers' language input would influence the Mandarin-English bilingual children's production of nouns and verbs. The results revealed that the influence of the caregivers had no significant effect on the frequency of initial Mandarin words regardless of nouns or verbs. And nouns (M = 24.83) and verbs (M = 21.00) did not vary significantly on the frequency of initial Mandarin words. There was no significant interaction between caregivers' influence and

the frequency of initial Mandarin words in this case. In the case of final Mandarin and initial English words, the influence of the caregivers had a significant main effect on bilingual children's production of nouns and verbs. In both cases, the frequency of nouns was found being an important variable best predicting the noun-prevalence in final Mandarin and initial English utterances.

Prior studies confirmed such correlations. For example, Tardif (1993, cited in Tardif, 1996) reported that Mandarin-speaking mothers were found to place verbs at the beginnings and ends of utterance with much higher frequencies than they place nouns. This was very likely to result in their children's verb bias. Goldfield (1993, cited in Tardif, Shatz, & Naigles, 1997) reported that in multi-word utterances, nouns occurred more often in final position, whereas verbs occurred often in medial position in English. This seemed to suggest that nouns are more salient in the child-directed speech than verbs. It may explain the predominance of nouns in children's early vocabularies. Lucas and Bernardo (2008) indicated that children's lexical bias may be attributed to caregivers' salient positions; however, the influence of salient position is considerably different. Specifically, the frequency of Filipino nouns in the final position of utterances is a significant predictor; in contrast, the frequency of English nouns in the initial position is significant. Regarding verbs, the proportion of Filipino verbs in the initial position is a significant indicator; nevertheless, the proportion of English verbs in the final position is significant.

But, the interaction between caregivers' influence and children's frequency of final Mandarin words and initial English words was not significant. With regard to the final English words, findings seemed to be very significant, not only because caregivers' influence had a significant main effect, but also because nouns in the final English words were a significant predictor. Most importantly, a significant interaction between caregivers' influence and children's frequency of final English words was manifested.

After the discussion based on the initial findings, there were still some questions, which need to be explored in depth. Responses to these questions are expected to answer the divergences that emerged from the results.

One question was very intriguing to explore: Based on the total number, why was caregivers' initial Mandarin lexicon noun biased, when children's language production in the Mandarin initial position verb biased? The first reason may be that although the total number of children's language production in the Mandarin initial position was verb biased, children's noun frequency was higher than verb frequency. Therefore, the results did not deny the accordance between caregivers' lexical bias and that of children. Second possible reason was that grammar of Mandarin allows noun-dropping, this nature of Mandarin syntax structure made verbs occur more often in children's language production.

Another question was why Mandarin-English bilingual caregivers' and children's lexicon across all salient positions, namely, initial Mandarin, final Mandarin, initial English, and final English, seemed to be noun biased in terms

of frequency (%). A very plausible reason may be a fact that the naturalistic interactions between bilingual caregivers and children in the present study were based on the picture-books, which these preschool bilinguals had used in their classes. Most probably, conversations were confined to a "question-and-answer" model of activity context, which may expect children to produce more nouns, although some children were encouraged to talk more aside from the chosen topics. This nature of activity could be an important reason for such noun bias manifested both in caregivers' language input and in children's language production across all salient positions of utterances.

Activity context was also regarded as an important factor, which is related to the lexical bias in children's early vocabularies. Tardif, Gelman, and Xu (1999) emphasized that the noun bias hypothesis is subject to many factors, such as the sampling methods and the context wherein the experiments are taking place. They concluded that nouns prevail in book reading, but nouns are not predominant in toy play.

In conclusion, the results from the study suggest that nouns and verbs in Mandarin-English bilingual children's language production had an identical frequency; therefore, it appears very hard to differentiate the lexical bias across overall data. Tardif's (1996) standpoint that method of counting nouns may contribute to the lexical bias of Mandarin-speaking children was validated in a bilingual setting in the present study. However, verb bias was found in bilingual children's Mandarin vocabularies and noun bias appeared in their English words. Replicating a great number of previous studies, the present study drew the conclusion based on the bilingual participants. The results suggest that caregivers' frequency of nouns in the final position of utterances seemed to influence children's noun bias in Mandarin. The frequency of nouns in the final position of caregivers' language input was a robust variable best conditioning children's noun bias in English.

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Appendix 1
Transcription Conventions 2

.....
A: newspapers and stuff/ A dotted line marks the beginning of a stave and indicates that the words enclosed by the lines are to
B: yes / be read simultaneously.
.....

A: papers and [stuff/ Brackets around portions of utterances indicate the
B: Yes/ good/ start of overlap.
.....

A: they're mean to be= Equals signs indicate that there is no
B: = adults/ discernible gap between the two chunks of talk.
.....

She pushes him to the limit/ A slash (/) indicates the end of a tone group or chunk of talk.

Pregnant? A question mark indicates the end of a chunk of talk which is being analyzed as a question.

He's got this twi-twitch/ A hyphen indicates an incomplete word or utterance.

He sort of . sat and read Pauses are indicated by a full stop (short pause – less than 0.5 seconds) or a dash (long pause).

((mean)) Double round parentheses indicate that there is doubt about accuracy of the transcription.

((xxxx)) Double round parentheses enclosing several 'x's indicate untranscribable material.

<LAUGHING> Angled brackets give clarificatory information, relating either to that point in talk or to immediately preceding underlined material.

MEXICO Capital letters are used for words / syllables uttered with emphasis.

Mexico	Emphatic stress on italicized item.
% bloody hell %	The symbol % encloses words or phrases that are spoken very quickly.
.hhh	This symbol indicates that the speaker takes a sharp intake of breath.
[...]	The symbol [...] indicates that material has been omitted.

Note. From *Language and gender: A reader* (p. xx), edited by Jennifer Coates, 1998, USA: Blackwell Publishers. Copyright 1998 by Blackwell Publishers Ltd.

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