

# A Study of Chinese Children' Academic Language Development in Multilingual Context of Shanghai

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**ABSTRACT.** Academic language is closely related to children's future academic achievements. This study focuses on the development of Chinese children's academic language, explores the influence of multilingual environment on academic language, and reveals the essence of early Chinese children's academic language acquisition. Research tested total of 406 preschool children in Shanghai for their Chinese, English and academic language abilities. Regression model is established and through statistics and analysis, it is found that vocabulary functions as academic language which increases with children's age. Multilingual environment is conducive to the development of academic language and vocabulary is an important factor. The research suggests that early children should be exposed to bilingual environment to increase their bilingualism, and they promote their academic language by reading bilingual knowledge picture books and watching bilingual popular science documentaries.

**KEYWORDS:** Early childhood; Academic language development; Influencing factors; Multilingual environment

## 1. Introduction

Academic language is special language ability in the process of children's language development. In recent years, it has become a hot issue in the international educational and linguistic circles.[1-2] In 2010, Professor Catherine Snow from the School of Education at Harvard University formally proposed the concept of academic language. In her opinion, academic language is a form of oral language with the characteristics of written language. It is characterized by simplicity, accuracy, objectivity, authority and logicity. It usually appears in books, academic papers, classroom and other learning situations. [3] It involves children's language, science, mathematics and many other fields.[4] Mastering academic language is closely related to children's development in reading and writing and it is the key to their future achievements.[5-6] The research of Harvard University has found that the defects of academic language ability will affect the development of students' reading and writing ability, resulting in learning difficulties. Specifically, some students know each word while reading, but it is very difficult for them to understand the content of the passage.[4] Therefore, academic language is related to children's academic achievement in the future. The study of children's academic language is of great importance to children's academic level and future development at school.

Language environment is the condition of language life in a certain region or community, and it is the basic feature of language use in society. Multilingual environment refers to the situation and conditions of two or more languages or language variants in society and life, including mother tongue, foreign language, dialect or ethnic language (in this paper, "multilingual" refers to Putonghua, English and dialect). Children's language development is determined by the following elements: the language environment, quality of language contact and language use.[8]

Halliday pointed out that the development of children's academic language is not easy, the lack of academic language contact opportunities in their living environment is a challenge to children's growth.[9] Children in Shanghai are exposed to Mandarin (Putonghua), English and Shanghai dialect in their daily life or in kindergarten. Children who learn the second language, including those whose mother tongue is Shanghai dialect, then Mandarin; or children whose mother tongue is Mandarin, and then English, may be very fluent in their social language, but their academic language level in the second language may be low, which may lead to their "learning difficulties" in the process of scientific learning;[10] at the same time, academic language is based on oral language and expression states, so the information conveyed is often "concise" and "accurate".[1-2] Academic language requires children to understand the diversity of vocabulary and choose accurate vocabulary for expression, that is to say, using simple, accurate and content-based vocabulary is the first element of

academic language ability,[13-15] the number of vocabulary acquired by children is the sufficient condition for the development of their academic language.

Therefore, this study chooses vocabulary as an indicator of academic language development, explores the relationship between early children's Chinese and English abilities and academic language development in a multilingual environment, and reveals the essence of early academic language acquisition. The key focuses are:

- (1) Does early childhood academic language improve with age?
- (2) Will multilingual environment affect the development of academic language?

## 2. Methodology and Materials

### 2.1 Participants

According to the method of group random sampling, 406 children from 16 kindergartens in six districts of Shanghai were selected. The ratio of male and female was 1:1. Before sampling, the class teachers were not informed of the content of the test, except the principle of sampling that the age of bottom class was 48 months (4-year-old group), middle class 60 months (5-year-old group), and top class 72 months (6-year-old group), error range was limited to 3 months. The age distribution of the sampled children is as follows:

*Table 1 Basic Information of Research Objects*

age(year)	number	male	female
4	135	67	68
5	136	67	69
6	135	68	67
total	406	202	204

The criteria for normal children are as follows.

*Table 2 Criteria of Selected Early Children in Shanghai*

Items	Criteria
Physical	Children have normal average intelligence and physical health without any disability.
Speech	Children can speak Mandarin clearly and fluently.
Experience	Children should have had exposure to an English language environment and have had some experience in understanding English (e.g., attend English classes, read bilingual picture books, listen to English children's songs or stories, and watch English cartoons.)
Family socioeconomic status	Children's family is harmonious and stable and where at least one of the parents has a college degree or higher and has a regular job or stable income.

This study was conducted subject to the ethical review of the sponsoring university. After the participants' kindergarten principals, teachers, and the children's guardians became aware of the study and signed informed consent, the study followed the principle of confidentiality. The names of the children were kept confidential and were numerically coded by ten interviewers, and all interviewers promised not to disclose the interview content and research information. They allowed the children to remain silent or refused to answer questions. After each interview, children were given gifts as a reward for their participation.

### 2.2 Methodology

In this study, early childhood behavior observation method was used to evaluate early childhood through bilingual competence and academic language tools.

#### 2.2.1 Academic Language Testing Tools

The assessment tool developed by the Children's Language Research Center of East China Normal University and the Education Research Institute of Harvard University was selected which is based on the test of English children's academic language development level.<sup>[16]</sup> Tools are mainly composed of two parts: academic language comprehensible test and expressive test. According to the characteristics of Chinese language and academic language, academic language comprehensible section consists of three parts: referential relation, restrictive modifying relation and logical relation.<sup>[17]</sup> According to the guidance, early children should point out the corresponding pictures with their fingers to score, otherwise, they will not get any points. The test of academic language expressive ability mainly refers to the evaluation of children's ability to explain things. In this task, children are required to explain pictures of "apple" and "ball". At the research site, the researchers used recording pens, video recorders and other equipments to record the content of early children's narrations to collect data. Then they input the data into the computer language analysis software clan of CHILDES system for relevant calculation to obtain various evaluation indexes of children's academic language expressive ability.

### ***2.2.2 Tools for Testing Chinese Language Proficiency***

Two outcome variables, PPVT Chinese and EVT Chinese, were used to test the development level of Chinese language ability of early children.

#### **(1) Peabody Picture Vocabulary Test Chinese (PPVT Chinese)**

Peabody Picture Vocabulary Test (PPVT) is an internationally accepted vocabulary testing tool for early children. It is compiled by Lloyd M. Dunn and his wife and it is used internationally after revision. This study will apply this tool to the test of the receptive vocabulary level of early children. In Shanghai, the original scoring threshold is 10-115, the internal consistency of the test is 0.95, the retest reliability is 0.9, and the reliability is fairly high.

#### **(2) Expressive Vocabulary Test Chinese (EVT Chinese)**

Expressive Vocabulary Test (EVT) is also an internationally used testing tool for early children, which was developed and published by Williams in 1997. Expressive Vocabulary Test Chinese (EVT Chinese) has been translated, modified and tested by Professor Zhou Jing and her team members at Children's Language Research Center of East China Normal University, and it has been used in a number of studies on Chinese language proficiency in China.<sup>[18-19]</sup> In this study, the original scoring threshold of early children in Shanghai is 10-100, the internal consistency of the test is 0.96, the retest reliability is 0.89, and the reliability is fairly high.

### ***2.2.3 Tools for Testing English Language Proficiency***

Preschool Language Scale (PLS), was compiled by Zimmerman, et al. In 2004, the fourth edition, preschool language scale, Fourth Edition (PLS-4), was revised. It was used to evaluate the communicative ability of English as a second language for children aged 0-6. This scale is divided into two parts: English aural and comprehensible scale (PLS-AC) and expressive and communicative scale (PLS-EC). The Chinese version of the scale was translated and revised by Professor Zhou Jing and her team members at Children's Language Research Center of East China Normal University. It is used in the research projects on bilingual competence in China, which conforms to Chinese cultural environment and has high validity.<sup>[20]</sup> In this study, the original score of PLS-4 of early children is 5-30, the internal consistency is 0.96, the retest reliability is 0.85, and the reliability is high.

## **3. Results**

### ***3.1 Bilingual Ability and Academic Language Level of Early Children***

#### ***3.1.1 Descriptive Statistics of Bilingual Ability and Academic Language Level of Early Children***

The researchers tested the bilingual ability and academic language level of 406 early children in Shanghai, and filtered the collected data. Excluding the scores below 0 or above the full score, the qualified test scores are 406, so the effective rate and the data integrity rate are both 100%. These scores are input into SPSS22.0 software for statistical analysis and the results are as follows:

Table 3 Descriptive Statistics of Bilingual Ability and Academic Language Test of Early Children

Items		N	Min	Max	Mean	SD
Chinese ability	PPVT	406	0	111	44.54	22.110
	EVT	406	0	100	49.37	11.766
English Ability	PLS-AC	406	0	42	5.33	5.289
	PLS-EC	406	0	44	8.86	3.406
Academic Language		406	0	16	8.59	2.394
Valid N (list wise)		406				

As shown in the table above, there are individual differences in bilingual ability and academic language level among early children. Among them, the level of Chinese understanding and expression varies greatly among individuals. The differences of English comprehensible ability and expressive ability between individuals are smaller than those of Chinese ability. Academic language level also varies with individual.

### 3.2 Growth Model of Early Children's Academic Language

In this study, 406 children's academic language scores were measured and inputted into SPSS22.0 software. They were divided into three age groups: 4, 5 and 6 and analysis were made within each group. The statistical results are shown as follows:

Table 4 an Analysis of the Differences of Academic Language Level among Children of Different Ages

Item	AC Scores				X <sup>2</sup>
	Min	Max	Mean	SD	
Age	4	0	12	7.19	81.26***
	5	4	13	8.68	
	6	6	16	9.91	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

As shown above, there are significant differences in academic language among children aged 4, 5 and 6,  $X^2 = 81.26$ ,  $P < 0.001$ . The 6-year-old group is obviously better than the 4-year-old and 5-year-old groups.

In the same way, the study conducted an inter-group analysis of variance on 406 children's academic language performance, the results are as follows:

Table 5 Statistical Table of the Differences between Different Age Children's Academic Language Groups

(I) age	(J) age	Average difference (I-J)	Standard error	Significance	95% Confidence interval	
					minimum	maximum
4	5	-1.059*	.277	.000	-1.60	-.51
	6	-2.096*	.278	.000	-2.64	-1.55
5	4	1.059*	.277	.000	.51	1.60
	6	-1.037*	.269	.000	-1.56	-.51
6	4	2.096*	.278	.000	1.55	2.64
	5	1.037*	.269	.000	.51	1.56

\* $p < 0.05$ .

As shown in the table, the academic language level of children in the 4, 5 and 6-year-old groups are significantly different. The 6-year-old group is much better than the other two groups, and the 5-year-old group is better than the 4-year-old group. The older they are, the better their academic language performance will be.

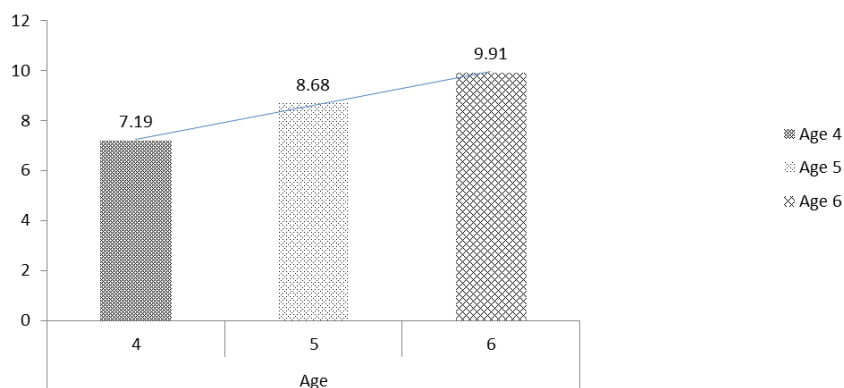


Figure.1 Academic Language Development Trend Chart of Children of Different Ages

As shown in the figure, the academic language development of children aged 4, 5 and 6 is on the rise. With the growth of children's age, the development of academic language level will be better.

### 3.3 Factors Influencing Early Childhood Academic Language Development

#### 3.3.1 The Relationship between Early Children's Bilingual Ability and Academic Language

406 children's bilingual tests and academic language scores were input into SPSS22.0. The correlation between PPVT, EVT, PLS-AC, PLS-EC and AC was analyzed to find the relationship between academic language level and children's bilingual ability. The statistical and analysis results are as follows:

Table 6 an Analysis of the Correlation between Children's Bilingual Ability and Academic Language

	PPVT	EVT	AC total	PLS-AC	PLS-EC
PPVT	1				
EVT	.603**	1			
AC total	.396**	.393**	1		
PLS-AC	.422**	.422**	.282**	1	
PLS-EC	.444**	.512**	.337**	.785**	1

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

The above is the analysis of the relationship between children's bilingual ability and academic language. There is a significant correlation between Chinese understanding ability, Chinese expressive ability, English understanding ability, English expressive ability and academic language ( $P < 0.01$ ). Therefore, there is a significant correlation between children's bilingual ability and their academic language level. If children's bilingual ability is good, their academic language level is good too; otherwise, their bilingual ability is weak, and their academic language level is not impressive. At the same time, the correlation coefficients between PPVT, EVT, PLS-AV, PLS-EC and AC are compared, the results show that their Chinese ability (PPVT, EVT) is greater than English ability, which indicates that Chinese ability is more related to academic language development than English ability.

#### 3.3.2 The influence of early bilingual ability on academic language

The study found a severe correlation between children's bilingual ability and their academic language level. In order to further judge the causal relationship between them, the study set the academic language level as the dependent variable, and the Chinese language ability (PPVT, EVT) and English ability (PLS-AC, PLS-EC) of children as the independent variables, established multiple regression equations, and analyzed the relationship between the variables. Preliminary analysis shows that PLS-AC is either not in the statistical range or unobscured in the development of AC. PLS-AC variables are excluded from the model, and the other three

variables are retained for regression equation fitting. The statistical results are as follows:

*Table 7 Summary of the New Multiple Linear Regression Model*

model	R	R square	R square after adjusted	Standard skew error	Change statistics			
					R square change	Change of F value	df1	df2
1	.457a	.209	.203	2.138	.209	35.323	3	402

*a. Predicted value: (constant), PLS-EC, PPVT, EVT*

After model adjustment,  $R^2 = 0.203$ , the variation is 0.006, and  $F(3402) = 35.323$ ,  $P = 0.000 < 0.05$ , which is a significant level and a significant correlation. Therefore, a multiple linear regression model can be established between the three independent variables and the dependent variables. The equation is as follows:

*Table 8 Regression Analysis of Bilingual Ability and Academic Language in Early Childhood*

model		Non-standardized coefficient		standardized coefficient	T	significance
		B	Standard error	Beta		
1	(constant)	4.763	.469		10.158	.000
	PPVT	.024	.006	.219	3.861	.000
	EVT	.038	.012	.186	3.151	.002
	PLS-EC	.102	.037	.144	2.741	.006

*a. dependent variable \: AC total*

As shown in the table, the adjusted multiple linear regression model is standardized, and there is significant correlation between the three independent variables and the dependent variables. The regression equation is:

$$\hat{y} = 4.763 + 0.219X_1 + 0.186X_2 + 0.144X_3$$

The development of children's Chinese language ability and English expressive ability can improve their academic language level. Among them, PPVT and AC are the most significant variables. Compared with the other two variables, understanding language has the greatest impact on the development of academic language. In other words, the development of PPVT has an important correlation with the development of academic language. In addition, PPVT and EVT have a greater impact on AC than PLS-AC and PLS-EC. Therefore, the mother tongue ability has more influences on the development of children's academic language, and it also proves that vocabulary is the first factor in the development of AC from the practical level.

## 4. Discussion and Suggestions

### ***4.1 Vocabulary is an important factor in the development of academic language. Children master a certain amount of academic vocabulary, but the number and types of vocabulary of them are not enough, their explanatory language in particular, needs improving***

It is found that the development of children's bilingual comprehensible vocabulary and expressive vocabulary has an important impact on the development of their academic language. Comprehensible vocabulary is the input part of language, which helps children to understand the outside world. Especially some proper nouns and academic terms are the main components of academic language. Expressive vocabulary, as the output part of language, is one of the indicators to measure children's mastery of language, reflecting children's semantic understanding and application. Academic language usually tests the academic level of children's language output and predicts their future academic development.[6] Research shows that there is a close relationship between the two. Therefore, children's mastery of vocabulary determines the development of their academic level in the future. For example, the "30 million vocabulary gap" originates from children's contact and mastery of vocabulary before the age of six, and it predicts their future development direction.[22] Vocabulary is the basis of academic language development and the first element of the structural characteristics of academic language.[23] Moreover, the study also finds that the number and types of vocabulary possessed by the children are not rich enough, such as the characteristics, attributes and functions of explanatory languages need to be improved, which are related to children's future academic achievements and need to be paid attention by families

and kindergartens. Parents and teachers should inspire and guide children to read knowledge picture books, visit museums, actively participate in nature observation, discover environmental things, and acquire professional vocabulary and academic language.[26]

#### ***4.2 Early Childhood Academic Language Development Shows a Good Trend, But There Are Still Insufficient and Unbalanced Phenomenon in Academic Language Development, with Obvious Individual Differences***

Research shows that children's academic language develops well with age. Children in the 6-year-old group are significantly better than those in the 4-year-old and 5-year-old groups; The 5-year-old group is better than the 4-year-old group. Excluding the external physical growth factors of children themselves, the internal cognitive and emotional aspects of children grow up with age, and become more and more mature. Their awareness of the outside world and capability of accepting and processing information continue to improve and their ability to understand and express academic language has also been promoted. This result confirms Jiang Zhongxin's research on the development of academic language.[28] Behind the positive development, the study also found that children's academic language development was inadequate and unbalanced. Children have a limited number of vocabulary, especially their academic language is limited to the naming and species of nature and creatures. There are few words and complex syntactic structures about the deep functions and characteristics of cognition. These indicate that the development of children's academic language is insufficient and needs further improvement. In addition, descriptive statistics of children's academic language level shows that the distribution of group academic language is discrete, and the differences between individuals are obvious. The individual differences of children's academic language may be related to their family social economic status, and parents' investment in children's education.[19] It is also closely related to children's picture book reading and bilingual ability. Previous studies have found that early reading is an effective way to improve academic language. Children may as well start with early reading in order to improve their academic language level, with more reading opportunities of picture books and effective reading guidance, their academic language level could be enhanced, and the gap between individuals could also be narrowed.[30]

#### ***4.3 Multilingual environment is conducive to the early development of academic language. However, highlighting the importance of English learning at the expense of Chinese development, is not worth the loss of children's academic language development***

In Shanghai, a multilingual environment has been formed with many languages coexisting there, and children are in a multilingual environment. They learn more than two languages and have access to different cultures. By comparing the similarities and differences between the two cultures, they can be more tolerant and inclusive of new things, think from different perspectives when encountering problems, thus forming an open character. These are the characteristics that must be possessed in the learning process of academic language. The study found that children's bilingual ability can promote the development of academic language, which supports the view that "early bilingual learning has cognitive advantages". In particular, there is a significant correlation between the ability to understand and express English and the development of academic language. To some extent, the growth of English vocabulary is conducive to the development of academic language and it also enriches the professional vocabulary of academic language. It can be said that English learning is to open a new window for children to further understand and recognize the different foreign cultures from their own culture, which is beneficial for the development of children's academic language. It is not advisable for parents to attach importance to English development and at the meantime neglect Chinese learning.[20] In particular, to improve children's early academic language ability, parents should not abandon the development of Chinese, or at the expense of Chinese. In this way, the development of academic language tends to go to extremes, which may not be conducive to children's future campus learning. After all, their academic language is mainly Chinese.<sup>[32]</sup> Therefore, the multilingual environment is conducive to the development of academic language. Children's academic language learning needs to adhere to the principle of "Chinese comes first, and English keeps up", and their academic language level would gradually improve.

## **5. Conclusion**

This study focuses on the development of academic language, explores the influence of mother tongue and foreign language on academic language, and concludes that vocabulary is an important factor of academic language; children's academic language level increases with age; multilingual environment is conducive to the development of academic language. This study is the beginning of quantitative research on early childhood

academic language. The sampling is limited to Shanghai area. Such research will be carried out in the follow-up projects, and the number and scope of children will no longer be limited to Shanghai but nationwide. The track and stage of preschool children's academic language development will be explored in depth by employing a mixed method of qualitative and quantitative research, so as to provide early intervention and guidance for children's academic achievement in the future.

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