

Chapter Three

Experimental Methods

In this chapter, the research design will be presented. The present study is to investigate the acquisition of the Chinese count and mass classifiers by Chinese preschoolers aged between three and five. Section 3.1 describes the background information of the subjects. Section 3.2 reports the methodology, where the test materials and methods will also be mentioned. Section 3.3 introduces the experimental procedures. Finally, section 3.4 presents a brief summary of Chapter Three.

3.1 Subjects

The present study conducted a quantitative experimental method to examine Chinese preschoolers' linguistic competence. The participants involved were forty-five children between the ages of three and five. In addition, the children were assigned to one of three age groups (G1 to G3) with one-year interval. Hence, each age group had fifteen subjects respectively. Table 1 presents the grouping of the child sample.

Table 3-1: Basic Information of the Subjects

Group	Age	Number of Participants
1	3	15
2	4	15
3	5	15

For the purpose of scrutinizing whether Chinese children, at early stages of language acquisition, comprehend and produce the grammatical count-mass distinction, the target subjects were Chinese children acquiring Mandarin Chinese as

their first language and demonstrated a level of Chinese language comparable to children at the same age¹. All these forty-five subjects also shared a similar geographical background, viz Tainan, Taiwan, and were sampled from the Guanghai kindergarten there.

The Guanghai Kindergarten curriculum primarily focused on children's balanced growth and display of their mental talents. In consequence, teachers from Guanghai did not attempt to pressure children into intellectual growth in the early years. Unlike most traditional schools, they did not teach children any Zhuyin Transcription system (Guoyu zhuyin fuhao). Instead, in order to spark the children's individuality and develop a love of learning and searching, the teachers designed various activities related to Language Arts, Mathematics, Social Studies and Science. The Main Lesson time in the morning consisted of about three hours devoted to Language Arts/Social Studies/Mathematical activities so that the children had plenty of time exploring different subject matters. Some days (every Tuesday) were also devoted to taking special field trips. The Main Lesson time in the afternoon consisted of about two hours devoted to the reading center and exploration area in the kindergarten. In the reading center, the teachers there told stories or read a lot of wonderful books to the children. Fairy tales, fables, myths and legends were so extensively used in the Guanghai curriculum that these stories presented the fundamental issues of life in a symbolic form which helped the children develop the ability to perceive and understand the world. In the exploration area, children could handle and examine animals, plant life and objects and find things outdoors to bring in for further study and examination. In this curriculum, the children also had opportunities for artistic expression. Drawing, painting, music, pottery, woodworking

¹ The researcher checked with the kindergarten teachers to ensure that the subjects did demonstrate a level of Chinese language comparable to children at the same age.

and many other activities provided this opportunity.

3.2 Methods and Materials

The present study adopted a quantitative experimental approach to evaluate Chinese preschoolers' linguistic competence. In language acquisition research, in order to investigate L1 learners' comprehension and production of the target language there are different quantitative methods in use, including different eliciting tasks such as imitation tasks, completing sentences, act-out tasks, problem-solving tasks, picture-cued tasks, truth-value judgment tasks, etc (McDaniel et al. 1996). According to Miller (1981), these eliciting tasks can increase the efficiency and specificity of assessing language behaviors that occur infrequently in natural language. Furthermore, among the above-mentioned various eliciting methods, picture-cued tasks were most widely used (Pinker et al. 1987, Izumi and Lakshmanan 1998). On the one hand, pictures can increase the understanding of the context, enhancing the validity and reliability of the experiment. On the other hand, with the help of pictures, the task becomes vivid and stimulating, and thus subjects feel more relaxed and are more willing to participate in the experiment.

Two tasks were designed in this study to elicit the subjects' linguistic knowledge within a short period of time — one comprehension task and one production task. As can be seen in the literature review in Chapter Two, some of the researchers (i.e., Fang 1985, Chien et al. 2003) included only one type of task, which turns out weak in making any substantial and satisfying claims. Hence, both comprehension and production tasks were adopted: a picture identification (henceforth PI) task for comprehension and a picture description (henceforth PD) for free production. Moreover, with two types of tasks designed, we can see if comprehension is indeed easier than production.

Based on the classification of Chinese count and mass classifiers discussed in Chapter Two, test materials were designed for each task. First of all, ten count classifiers and eight mass classifiers were selected to examine from a pool of Chinese count and mass classifiers. Corresponding to the count classifiers and mass classifiers, thirty-six individual objects (or substances) were included. Table 3-2 provides details of the count and mass classifiers in the PI and PD tasks, their meanings, and the corresponding nouns designating the individual entities or substances that were used.

Table 3-2: Count Classifiers, Mass Classifiers, and Their Corresponding Nouns Used in Each Experiment²

Classifier	Semantic Feature	Expected Classifiers	Meanings	Corresponding Nouns	
				PI Task	PD Task
Count	human	<i>ge</i>	for general humans	<i>xiaoyinger</i> 'baby'	<i>xiaonanhai</i> 'boy'
		<i>wei</i>	for honored humans	<i>laoshi</i> 'teacher'	<i>yisheng</i> 'doctor'
	Non-human	<i>zhi</i>	for small animals	<i>xiaobaitu</i> 'rabbit'	<i>xiaoniao</i> 'bird'
		<i>tou</i>	for big animals	<i>runiu</i> 'cow'	<i>shanyang</i> 'goat'
	long saliently 1D	<i>tiao</i>	for something (animate or inanimate) long, thin, cylindrical, and flexible	<i>shengzi</i> 'rope'	<i>xianglian</i> 'necklace'
		<i>zhi</i>	for something long, thin, cylindrical, and rigid	<i>qianbi</i> 'pencil'	<i>bi</i> 'pen'

² These classifiers were chosen in that they are the most common ones.

	flat saliently 2D	<i>zhang</i>	for something with a thin, flat, rectangular, and two-dimensional extended surface	<i>tiezhi</i> 'sticker'	<i>kapian</i> 'card'
		<i>mian</i>	for flat and smooth objects	<i>jingzi</i> 'mirror'	<i>qizi</i> 'flag'
	round saliently 3D	<i>ge</i>	for round objects	<i>qiqiu</i> 'balloon'	<i>xigua</i> 'watermelon'
		<i>ke</i>	for small objects (hearts, pearls, teeth, diamonds, etc.) and also objects appearing to be small (distant stars and planets)	<i>caomei</i> 'strawberry'	<i>yachi</i> 'teeth'
Mass	standard measures	<i>gongjin</i>	kilogram	<i>tang</i> 'sugar'	<i>mi</i> 'rice'
		<i>gongfen</i>	centimeter	<i>xian</i> 'thread'	<i>chi</i> 'ruler'
	container measures	<i>wan</i>	bowl	<i>mifan</i> 'steamed rice'	<i>mian</i> 'noodles'
		<i>ping</i>	bottle	<i>niunai</i> 'milk'	<i>shui</i> 'water'
	partitive measures	<i>kuai</i>	a chunk, a lump, or a piece of something	<i>feizao</i> 'soap'	<i>dangao</i> 'cake'
		<i>pian</i>	slice	<i>tusi</i> 'toast'	<i>yezi</i> 'leaf'
	group measures	<i>qun</i>	objects which come in groups	<i>mianyang</i> 'sheep'	<i>houzi</i> 'monkeys'
		<i>shuang</i>	objects which come in pairs	<i>xiezi</i> 'shoes'	<i>kuaizi</i> 'chopsticks'

In the PI task, the children were told to play a guessing game with the experimenter and the cartoon character Snoopy (a stuffed animal). The experimenter held up Snoopy and told the child the rules of the game. That is, for each turn in the guessing game, the experimenter showed Snoopy three different objects, and then Snoopy picked out one of them and told the child what he wanted. The child was asked to guess what Snoopy wanted and pointed it to the experimenter. In other words, the subjects had to identify the target objects based on the classifier they heard from the verbal stimulus. If a Chinese child did comprehend the grammatical count-mass distinction, then he or she would choose an entity corresponding to a count noun in the count-selective context (e.g., *Shinubi shuo ta yao yi zhi sheme?*) and an entity corresponding to a mass noun in the mass-selective context. (e.g., *Shinubi shuo ta yao yi ping sheme?*)

The sample procedure for the PI task is as follows: (Child's name), *zhe shi shinubi. Ta yao gen women wan caicaikan de youxi. Mei yi ci wo hui rang ta kan san-yang dongxi. Ta keyi xuanze yi-yang ta xihuan de. Ranhou ni yao caicaikan. Gaosu wo shinubi yao de shi sheme, haoma?* '(Child's name), this is Snoopy. He is going to play a guessing game with us. At each turn I will show him three different things and he is allowed to pick out the one he likes. You will then make a guess and tell me what Snoopy wants, okay?' The experimenter put three things (e.g., Two pictures of objects and one substance: a teacher, a rabbit, and some steamed rice) in front of the child, pointed to them, and continued with the following conversation (Table 3-3). The child was expected to tell the experimenter what Snoopy wanted by naming or pointing to one of the three things.

Table 3-3: A Test Sample for the PI Task

(Child's name), *zhe shi shinubi*.

(Child's name), this is Snoopy

Ta yao gen women wan caicaikan de youxi.

He wants with us play guess DE game

Mei yi-ci wo hui rang ta kan san-yang dongxi.

Each one- CL_{count} I will let he look three- CL_{count} things

Ta keyi xuanze yi-yang ta xihuan de.

He can choose one- CL_{count} he like DE

Ranhou ni yao caicaikan,

Then you should guess

Gaosu wo shinubi yao de shi sheme, haoma?

Tell I Snoopy want DE is what, okay

‘(Child's name), this is Snoopy. He is going to play a guessing game with us. On each turn I will show him three different things and he is allowed to pick out the one he likes. You will then make a guess and tell me what Snoopy wants, okay?’

Zhe shi laoshi, zhe shi mifan, zhe shi xiaobaitu.

This is teacher, this is steamed rice, this is rabbit

Shinubi shuo ta yao yi-zhi dongxi.

Snoopy say he want one-CL_{count} something

Gaosu laoshi Shinubi yao yi-zhi shemo.

Tell teacher Snoopy want one-CL_{count} what

‘This is a teacher, this is steamed rice, and this is a rabbit. Snoopy says that he wants something. Tell teacher what Snoopy wants.’

In total, there were eighteen test trials in this guessing game. Hence, eighteen pictures of individual objects or substances (one for each classifier) were included in the PI task. Besides, three substances such as sugar, steamed rice and milk were stored in three separate transparent plastic bags. No actual containers corresponding to the

mass classifiers tested were shown. This was to rule out the possibility that a child could have chosen a correct substance (e.g., *mifan* ‘steamed rice’) for a given mass classifier (e.g., *wan* ‘bowl’) simply because of his or her attention to the container, rather than his or her understanding of the constraint that existed between the given mass classifier and the noun corresponding to the substance. Table 3-4 shows the test items for this task.

Table 3-4: Test Items Used in the PI Task³

Q1	C7 <i>tiezhi</i> ‘sticker’	C1 <i>xiaoyinger</i> ‘baby’ *	M1 <i>tang</i> ‘sugar’
Q2	C10 <i>caomei</i> ‘strawberry’	C3 <i>xiaobaitu</i> ‘rabbit’	M4 <i>niunai</i> ‘milk’ *
Q3	C4 <i>runiu</i> ‘cow’ *	M6 <i>tusi</i> ‘toast’	C1 <i>xiaoyinger</i> ‘baby’
Q4	C9 <i>qiqiu</i> ‘balloon’	M2 <i>xian</i> ‘thread’ *	M8 <i>xiezi</i> ‘shoes’
Q5	C8 <i>jingzi</i> ‘mirror’	M4 <i>niunai</i> ‘milk’	C10 <i>caomei</i> ‘strawberry’ *
Q6	M5 <i>feizao</i> ‘soap’ *	M7 <i>mianyang</i> ‘sheep’	C6 <i>qianbi</i> ‘pencil’
Q7	C2 <i>laoshi</i> ‘teacher’	M3 <i>mifan</i> ‘steamed rice’	C3 <i>xiaobaitu</i> ‘rabbit’ *
Q8	C6 <i>qianbi</i> ‘pencil’	C5 <i>shengzi</i> ‘rope’ *	M4 <i>niunai</i> ‘milk’
Q9	M8 <i>xiezi</i> ‘shoes’ *	M2 <i>xian</i> ‘thread’	C3 <i>xiaobaitu</i> ‘rabbit’
Q10	M6 <i>tusi</i> ‘toast’	C10 <i>caomei</i> ‘strawberry’	M3 <i>mifan</i> ‘steamed rice’ *
Q11	C2 <i>laoshi</i> ‘teacher’ *	C1 <i>xiaoyinger</i> ‘baby’	M7 <i>mianyang</i> ‘sheep’
Q12	M1 <i>tang</i> ‘sugar’	M7 <i>mianyang</i> ‘sheep’ *	C5 <i>shengzi</i> ‘rope’
Q13	M3 <i>mifan</i> ‘steamed rice’	C8 <i>jingzi</i> ‘mirror’	C7 <i>tiezhi</i> ‘sticker’ *
Q14	M8 <i>xiezi</i> ‘shoes’	M6 <i>tusi</i> ‘toast’ *	C4 <i>runiu</i> ‘cow’
Q15	M1 <i>tang</i> ‘sugar’ *	C9 <i>qiqiu</i> ‘balloon’	C2 <i>laoshi</i> ‘teacher’
Q16	M5 <i>feizao</i> ‘soap’	C7 <i>tiezhi</i> ‘sticker’	C6 <i>qianbi</i> ‘pencil’ *
Q17	C4 <i>runiu</i> ‘cow’	C9 <i>qiqiu</i> ‘balloon’ *	M2 <i>xian</i> ‘thread’
Q18	C8 <i>jingzi</i> ‘mirror’ *	M5 <i>feizao</i> ‘soap’	C5 <i>shengzi</i> ‘rope’

Note: The asterisks stand for the target answers. C1= *ge* for general humans; C2= *wei*; C3= *zhi* for small animals; C4= *tou*; C5= *tiao*; C6=*zhi* for something long, thin, cylindrical, and rigid; C7=*zhang*; C8= *mian*; C9= *ge* for round objects ; C10= *li*; M1= *gong jin*; M2= *gong fen*; M3= *wan*; M4= *ping*; M5= *kuai*; M6= *pian*; M7= *qun*; M8= *shuang*.

³ See Appendix B for the pictures used in the comprehension task.

In the PD task, children were presented with a picture and asked to describe the picture. There were a total of 18 elicitation pictures with each drawing containing one target object. The sample procedure for the task is as follows: (Child's name), *zheli you yixie tupian. Women lai kankan ni de guanchali haobuhao. Wo hui ba tupian na gei ni kan. Ni yao caiyicai tupian litou you sheme, haoma?*

Table 3-5: A Test Sample for the PD Task

(Child's name), *zheli you yixie tupian.*

(Child's name), here have some pictures

Women lai kankan ni de guanchali haobuhao

We come see you ASSOC observation good or bad

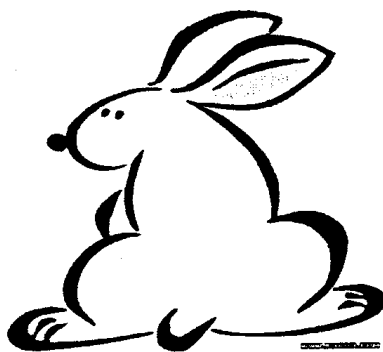
Wo hui ba tupian na gei ni kan

I will BA pictures take to you see

Ni yao caiyicai tupian litou you sheme, haoma

You should guess pictures inside have what, okay

'(Child's name), there are some pictures here. Let's see if you are observant about things around you. I will show you the picture one by one. You will then guess what these pictures are, okay?'



Zhe li you yixie tupian, gaosu laoshi tupian li you sheme.

here have some pictures tell teacher picture in has what

'Here are some pictures. Tell the teacher what is in the picture.'

3.3 Procedures

This section presents the pilot study, pretest, formal testing, and scoring of the present study.

3.3.1 Pilot Study

A pilot study was given to twelve children in April, 2005 before the formal testing. The participants involved were twelve Mandarin-speaking children (seven males and five females) between the age of four and six, recruited from the Wangfan kindergarten in Taipei. A comprehension task, namely a picture identification task, was designed to examine six Chinese count classifiers (*zhi*, *zhang*, *ge*, *tiao*, *zhi*, and *kuai*) and six mass classifiers (*ping*, *bao*, *he*, *bei*, *wan*, and *dai*).

The results of the pilot study are summarized as follows (see Appendix for more details): First, twelve participants at their early stages of language acquisition, honored the grammatical count-mass distinction. Additionally, CL-noun associations made by children were mainly “within-category” associations. That is, children were able to make fine differentiations between count and mass classifiers and their respective corresponding referents. Second, developmental differences were found among Chinese children’s abilities to comprehend count and mass classifiers. The older the children were, the better they could detect the differences. Third, children performed slightly better on count classifiers (88.41%) than on mass classifiers (84.17%). All children sample exhibited this tendency without exception. Fourth, the animacy classifier *zhi* was by far the easiest among the three age groups. In other words, it is reasonable to suggest that *zhi* should be one of the earlier classifiers acquired by children. Finally, it was found that the general classifier *ge* was the one that caused children the most problems in the comprehension task. Young children overused the general classifier *ge* and allowed it to co-occur with almost every noun

regardless of the different semantic properties denoted by the noun's referents.

Though the pilot study was designed with the stimuli carefully, it still has its limitations. To begin with, only twelve classifiers were examined which are commonly used by adults and a subset of the "core classifiers" observed by Erbaugh (1982). It is possible that children might have acquired classifiers other than the tested ones. To get a better picture of the acquisition of the classifier system, more classifiers should be considered. Furthermore, the six tested classifiers are limited to container measure words, so further scrutiny of other types of mass classifiers is necessary. Last, the pilot study simply deals with the children's comprehension. Their production of count and mass classifiers is definitely worthy of investigation.

3.3.2 Formal Testing⁴

Before the data collection, the researcher explained to the kindergarten teachers the purpose and procedures of the present study. The background information of the forty-five subjects were also consulted before the formal test. All experiments were conducted individually in Mandarin Chinese in the classroom of the kindergarten. The two tasks were recorded with back-up notes. The subjects' responses were entered on a pre-designed scoring sheet simultaneously during the experiment.

The PD task was given to the subjects first to prevent them from getting hints from the PI task. The warm-up activities were given before the subjects began each task. During the warm-up activity in the PD task, children were given three different practice pictures of cars, flowers and books and were asked to describe the pictures by

⁴ In order to make sure that the two tasks designed for the present study are valid and reliable, a pretest was given in May 2006 before the formal test. Six Mandarin-speaking children recruited from Tainan aged between three and five participated in the pretest. It took the subjects about twenty to thirty minutes to finish the PD and PI tasks. The results of the pretest showed that in the production task (PD task) most subjects predominately used the general classifier *ge* for almost every noun. The only exception was one five-year-old boy who obviously noticed the different semantic properties denoted by the referents of nouns.

using the classifier phrase (CLP) “numeral + CL + noun.” Once the children familiarized themselves with the CLP, the actual PD task began followed by the PI task. During the warm-up activity in the PI task, the child was then asked if he or she liked to play a guessing game with the experimenter. Before the actual trials, a two-minute familiarization session was given to ensure that the participant knew the names of the objects or substances. Following the familiarization session, a two-minute training session of the same procedures for the test session was given to make sure that the participant understood the procedures for the task. After all subjects completed the tasks, the collected data were scored and analyzed by the SPSS statistic package.

3.3.3 Scoring

In the present study, correct responses were determined according to the CL-noun associations listed in Table 3-2. For instance, the classifier *zhang* tested in the PI task should be associated with *tiezhi* ‘sticker’ rather than *xiaoyinger* ‘baby,’ *jingzi* ‘mirror,’ *qianbi* ‘pencil,’ *feizao* ‘soap,’ *tang* ‘sugar,’ or *mifan* ‘steamed rice.’ Only the *zhang-tiezhi* linkage was considered correct. The classifier *zhang* tested in the PD task was expected to link with *kapian* ‘card’ rather than *nanhai* ‘boy,’ *yisheng* ‘doctor,’ *xiaoniao* ‘bird,’ *shanyang* ‘goat,’ *xianglian* ‘necklace,’ *bi* ‘pen,’ *qizi* ‘flag,’ *xigua* ‘watermelon,’ *yachi* ‘tooth,’ *chi* ‘ruler,’ *mian* ‘noodles,’ *shui* ‘water,’ *dangao* ‘cake,’ *yezi* ‘leaf,’ *houzi* ‘monkeys,’ or *kuaizi* ‘chopsticks.’ Only the *zhang-kapian* linkage was considered correct.

In the PI task, the subjects were given 1 point for each correct response, 0 point for an incorrect answer. For instance, suppose the expected answer from the subject was ‘*yi ke caomei*.’ If the subject’s answer was exactly the same as the expected one, then he/she was given a point. Answers different from the expected answer like ‘*yi ke*

niunai' were not given any point.

As for the PD task, the frequency of the correct use of the classifier was counted. Every one of the eighteen classifiers was expected to be elicited once in the production of a child. The total frequency produced by each group was divided by the total expected frequency of each group. Thus, the frequency and percentage of the results were calculated.

The data of each task were entered into SPSS (Statistical Package for Social Science) files and processed by the computer.

3.4 Summary of Chapter Three

In this chapter, the research design of the present study has been reported. The subjects, materials, methods, and procedures have been presented. The findings and discussions about the results will be reported in Chapter Four.