Chapter Three

Experimental Method

In this chapter, we will present the subjects and the research design of the present study. Section 3.1 describes the background information of the subjects, and Section 3.2 reports the research design and materials used in the present study. Section 3.3 introduces the experimental procedures, followed by a summary of Chapter Three in Section 3.4.

3.1 Subjects

The present study conducted a quantitative study to investigate Chinese-speaking preschooler's comprehension and production of *zenme* questions with *hui*. There were two groups of subjects—one was a control group and the other was an experimental group. The control group consisted of 16 college students of National Taiwan Normal University whose native language is Chinese. The experimental group in the present study was forty-eight Chinese children aged from 4 to 6 years old, as shown in Table 3-1:

Table 3-1. Background of the Subjects

Group	Age	Male	Female
1 (n=15)	4;0~4;11	8	8
2 (n=15)	5;0~5;11	8	8
3 (n=15)	6;0~6;11	8	8
Native control	19;0~23;0	8	8

The experimental group was children from Fu-Ren Kindergarten in Yong-kang, Tainan County. According to their parents and teachers, their grandparents speak to

them in Southern Ming at home sometimes, but most of the time the subjects' language used for communication is Chinese at home and in the kindergarten. Therefore, Chinese was considered as the subjects' first language.

The subjects go to the kindergarten five days a week. Their schooling is from 9 a.m. to 5 p.m. The class size is about 25 preschoolers aged from four to six. The classes in this kindergarten have indoor and outdoor activities. As for indoor activities, the subjects watch cartoons, listen to music, learn Chinese characters denoting daily equipment such as *wan* 'rice bowl' and match those characters to the correspondent pictures. In addition, the subjects spend about one hour reading every day learning a simple poem or nursery rhyme every week. They are exercising and running, etc.

3.2 Materials and Methods

In general, studies on language acquisition can be either longitudinal or cross-sectional. Longitudinal studies observe the subjects over a period of weeks, months, or years. The advantage of longitudinal design is that it provides fine and accurate data about the development of subjects' language. However, longitudinal studies are usually time-consuming and depend on the subjects' willingness to participate for a period of time. On the other hand, a cross-sectional design makes it possible to obtain a great deal of data within a short period of time. Due to the limitation of time, we will conduct a cross-sectional experiment.

As suggested by Karmiloff-Smith (1979, p.61), both of comprehension and production tasks should be conducted in the research of language acquisition to avoid "extrapolations which are only narrowly valid." Therefore, in the present study, we designed two tasks: Picture Identification Task (PI Task) for comprehension and Question-asking Task (QA Task) for production.

Based on the classification of the sentences with *zenme* and *hui* discussed in

Chapter Two, test materials for these sentences were designed. There were two types of questions, manner and causal questions with the different properties of the subjects (agent and nonagent) in different conditions (generic and nongeneric). Two test items were designed for each type. Table 3-2 provides details of each type and their correspondent examples. In total, there were twenty questions including four fillers, as shown in Table 3-2:[1]

Table 3-2. Tests Items Examined in the Present Study

Condition	Agentivity	Meaning	Example	Item	No.
Generic	Agent	Manner	Naozhong hui zenme chaoxing alarm clock will how awake ren? people 'In what way will the alarm clock awake people?'	2	Q1 Q2
		Causal	Naozhong zenme hui chaoxing alarm clock how will awake ren? people 'How come the alarm clock will awake people?'	2	Q3 Q4
	Non-agent	Manner	Yance hui zenme diao? colors will how fall-off 'In what way will the colors fall off?'	2	Q5 Q6
		Causal	Yance zenme hui diao? colors how will fall-off 'In what way will colors fall off?'	2	Q7 Q8
Non-generic	Agent	Manner	Xiaojing hui zenme da Xiaojing will how hit A-ming? A-ming 'How Xiaojing hit A-ming?'	2	Q9 Q10

[1] For a complete version of the PI Task, please see Appendix A.

		Causal	Xiaojing zenme hui da Xiaojing how will hit A-ming? A-ming 'How come Xiaojing hit A-ming?'	2	Q11 Q12
	Non-agent	Manner	Xiaojing hui zenme xihuan Xiaojing will how like A-ming? A-ming 'How will Xiaojing like A-ming?'	2	Q13 Q14
		Causal	Xiaojing zenme hui xiahuan Xiaojing how will like A-ming? A-ming 'How come Xiaojing likes A-ming?'	2	Q15 Q16
Fillers				4	Q17~ Q20
Total				20	

In the PI Task, the children were asked either a manner question containing *hui+zenme* or a causal question *zenme+hui*. After the question, the children were shown two pictures at the same time as shown in Table 3-3: one for the manner reading and the other for the causal reading. If the children understood the question, then they were able to choose the correct picture of the question. For example, after they heard the question *Xiaojing hui zenme da A-ming?* 'How will Xiaojing hit A-ming?', they were supposed to choose the picture in which the Xiaojing is hitting A-ming with a hammer.

Table 3-3. A Sample for the PI Task

Subjects will see:		Subjects will hear:
Picture 1 	Picture 2 	*Xiaojing hui zenme da A-ming*? 'How will Xiaojing hit A-ming?' *Zheli you liang zhang tupian. Na-yi-zhang tupian shi daan?* 'Here are two pictures. Which one is the answer?'

In the QA Task, the subjects listened to 16 scenarios[2], which elicited their production of questions. In each scenario, there was a rabbit, which liked to ask questions after each scenario but could not speak. The subjects were asked to help the rabbit ask questions. In the QA Task, a picture of a rabbit with a blank bubble and many question marks over its head was shown throughout the task. The children were asked to ask the questions that the rabbit wanted to ask. Besides, the puppets or pictures of characters mentioned in each scenario was put in front of the subjects to remind them of the main characters in the scenarios. For example, as shown in Table 3-4, while the subjects were listening to the description of the experiment, a tiger puppet and a bear puppet were shown to them.

[2] For a complete version of the QA Task, please see Appendix B.

Table 3-4. A Sample for the QA Task

Subjects will see:	Subjects will hear:
  	*Xiaotu zai lushang yudao laohu. Laohu shuo ta yao qu da Xiaoxiong. Xiaotu hen xiang zhidao Laohu da Xiaoxiong de fangfa. Keshi Xiaotu buhui shuohua* *(Kid's name), ni neng-bu-neng bang Xiaotu wen Laohu da Xiaoxiong de fangfa ne?* 'Rabbit met Tiger on the road. Tiger said he wanted to hit the bear. Rabbit couldn't speak but he still wanted to know the way Tiger would hit Bear. (Kid's name), can you help Rabbit ask the question?'

3.3 Procedures

In this section, the process and results of a pilot study are reported, followed by a formal study in which some revision of the materials is provided based on the inadequacies in the pilot study. Last, scoring policy is stated.

3.3.1 Pilot Study

In the pilot study, two tasks (picture identification (PI) and question asking (QA)

were conducted to 6 preschoolers. In the PI Task, the subjects were asked a series of questions by the experimenter and then were asked to choose a picture which answers the question. In the QA Task, the subjects had to ask a question after listening to a scenario provided by the experimenter.

In the PI Task, the youngest tended (i.e., 3-year-olds) to choose the pictures before listening to the questions. The others were able to respond to the questions and choose the pictures. It was found that the older subjects (i.e., 4-year-olds and 5-year-olds) showed different results. Two of them performed better on the manner question and the other two performed better on the causal question. This might be because some pairs of picture were ambiguous, either of which could be the answers to the questions. In addition, some vocabulary like *youqi* 'paint' used in the picture were not familiar to them.

In the QA Task, the causal *wh*-question word *weisheme*, across all ages, was the most frequently produced even in the scenarios where expected *wh*-questions (*hui zenme*) with manner reading were expected to obtain. For example, in a scenario which described Laohu's hitting Xiaoxiong and was expected to elicit a manner question that contains *hui zenme*, all of the subjects that took the QA Task produced a causal question, like *Laohu weisheme yao da Xiaoxiong* 'Why does the tiger want to hit the bear?' In addition, in some scenarios, some subjects just imitated the guided question. For example, the guided question is *Neng bu neng qing ni bang Xiaobaitu wen Xiaogou, Xiaoxiong banshu de fang fa*? 'Can you help the rabbit ask the dog how the bear move the books.' After listening to the sentence, the children copied most of what the experimenter said and produced such questions as *Ni zhi-bu-zhi- dao Xiaoxiong ban shu de fangfa*? 'Do you know the way in which the bear moved the books.' The target question containing *hui zenme* occurred rarely, and it was only asked by the three old subjects.

For the causal question (*zenme hui*), the genuine causal *wh*-question *weisheme* was the most frequently produced. All of the old subjects used *weisheme* instead of *zenme hui*. However, one five-year-old and one four-year-old subjects were able to produce the target pattern *zenme hui*.

There were some inadequacies of the pilot study. First, the experimenter encountered some problems in collecting data from the three-year-olds. In responding to the QA question, although the subject seemed to know the scenarios, he did not understand what he should do after the scenario even four training questions had been provided. Second, some scenarios consisted of too many characters involved, and thus the subjects were likely to get confused. Third, it was found that some pairs of pictures used in the PI Task were ambiguous, which resulted in unclear findings. Last, the number of subjects in the pilot was too small. Because of the above-mentioned problems, a revised and unambiguous set of pictures for the PI pictures and fewer characters in simpler scenarios for the QA Task are desirable.

3.3.2 Formal Study

In the present study, the subjects were selected from the Fu-Ren kindergarten. In the formal study, there were two tasks conducted: picture identification (PI Task) and question asking (QA Task). To avoid the practice effect, the QA Task was conducted first. After the 48 subjects finished the QA Task, the PI Task was conducted. In both of these two tasks, an MP3 recorder was used to record everything the subjects said in completing the two tasks.

For the QA Task, two scenarios were provided in the training section first. There were two training scenarios in the QA Task, and neither did they elicit manner nor causal questions. In order to make sure that subjects understand the whole process, the task did not begin until the subjects asked the question on his/her own. In the QA Task,

pictures mentioned in the scenarios were shown to the subjects. The time for the QA Task was about twenty minutes.

Table 3-5. Training Section Conducted in the QA Task

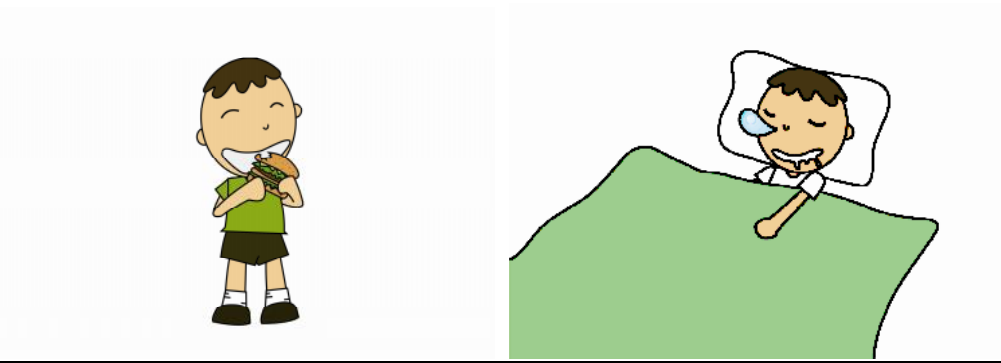
Zhe shi Xiaotuzi. Ta you henduo wenti xiang wen, danshi ta buhui shuohua, suoyi qing ni bang ta wen wenti, hao ma? 'This is Rabbit. He wants to ask a lot of questions, but he can't talk. Can you help him ask questions?' *Xiaotu zai lushang yudao Qingwa. Qingwa shuo ta yao qu zuochuan. Xiaotu hen xiang zhidao Qingwa jidian yao qu zuochuan. Keshi Xiaotu buhui shuohua. Ni neng-bu-neng bang Xiaotu wen Qingwa, jidian yao qu zuochuan?* 'Rabbit met Frog on the road. Frog said he was going to take a boat. Rabbit couldn't talk but he still wanted to know what time Frog would take the boat. Can you help Rabbit ask the question?

To collect data when the subjects were in good condition, we started tasks with the youngest subjects (4-year-old children) after the snack time in the morning. As for the older subjects, the data was collected after they took a nap in the afternoon. Both two tasks were conducted in a basement, which was a library for the children.

After the 48 subjects finished the QA Task, the PI Task was conducted. Before the formal task started, two training questions were provided. At the beginning of the training questions, the characters in the pictures, *Xiaojing* and *A-ming*, were introduced first. In addition, the experimenter also told the subjects that Xiaojing and A-ming were *ren* 'human.' After the experimenter ensured that the subjects could identify both characters, related questions were asked. Neither of the related questions were manner nor causal questions. Once the subjects finished the questions, the task

formally began. The overall time for the PI Task included the training section was approximately seven minutes.

Table 3-6. A Training Section Conducted in the PI Task

Zhe shi Gougou. Ta yao gen ni wan xuanxuankan de youxi. Ta hui wen ni. Ranhou hui gei ni kan tu. Ni keyi gaosu Guoguo na-yi-zhang tu shi duide ma?
'This is Doggie. He wants to play a choosing game with you. He will ask you a question with two pictures. Can you tell Doggie which one is the answer?'
Zhunbei hao le ma? Gougou yao kaishi wen wenti le.
"Are you ready? Doggie is going to ask you questions."
A-ming wancan chi sheme?
A-hua dinner eat what
(Then two pictures will be shown to the child.)
Picture A Picture B


3.3.3 Scoring & Statistical Analysis

This section reports the scoring of the two tasks.

In the PI Task, each correct response to the questions listed in the Table 3-2 was given one point. For example, when asked the target question like *Xiaojing zenme hui da A-ming?* 'how come A-hua hit A-ming', the subject was expected to choose the

picture in which A-ming is eating Xiaojing's cake, not the other picture in which Xiojing is hitting A-ming with a hammer. If the first picture is chosen, then one point was given. If not, no point was given. Since there were be eight manner questions and eight causal questions, the total score will range from zero to sixteen for manner and causal questions.

In the QA Task, as long as the subject produced the expected questions according to the scenario described, one point was given. For example, one point was given to a question like *Ren zenme hui bei meigui cishang* 'how come perople get pricked by the rose?' although the expected question is *meiguihua zenme hui ci shang ren* 'How come the rose can prick people?' Then, the frequency of correct patterns was calculated. The data of each task was processed by the SPSS. Further analyses of the errors in the QA Task were discussed in order to probe into the developmental process of the subjects' language acquisition.

3.4 Summary of Chapter Three

In this chapter, we have introduced the backgrounds of the subjects, the method and materials used in the two tasks (i.e., PI Task for comprehension and QA Task for production). In addition, the procedures (a pilot study, formal study, and scoring policy) were also described.