CHAPTER 4

RESULTS AND DISCUSSION

This section reports the research outcome of this thesis aligned with research objectives, including the pretest data analyzing result, the comparison between pretest and posttest, as well as the retention test.

4.1 Objective one and error analysis result of pretest

Objective 1 aims to analyze the problems in Chinese language study of P2 students. Error analysis is applied to measure P2 students' pronunciation ability. The evaluation result indicates that four main error types arranging from highest to lowest number error node are pronunciation errors (75.12%), pragmatic errors (13.75%), lexical errors (7.05%) and grammar errors (4.08%). Pronunciation error therefore proves to be the most serious part among all error types. Results from table 4.1 suggest that 26 students make a total of 465.66 language errors in the pretest. The top six language errors arranged from high frequency to low frequency are (1) pronunciation errors, (2) retroflex 'r', (3) blade alveolar 'c', (4) front palatal 'ch', (5) retroflex 'z', and (6) falling-rising tone.

Table 4.1 Error analysis of pretest

Error Type		Number of Errors				Percentage (%)
1. Alphabet/ sound (pronunciation error)		Chen	Mei	Jing	Average	**75.12**
1.1 Initial (Consonant) Errors						
Stop and affricative	k	19	19	14	17.33	3.72
Alveolar	n	2	3	2	2.33	0.50
Velar	h	24	22	23	23.00	4.94
Front palatal	j	17	16	13	15.33	3.29
	q	23	23	21	22.33	4.80
	x	19	19	19	19.00	4.08

Table 4.1 Error analysis of pretest (Continued)

Error Type		Number of Errors				Percentage (%)
Retroflex	zh	24	24	23	23.67	5.08
	ch	25	25	25	(**4**)25.00	5.37
	sh	24	22	24	23.33	5.01
	r	26	26	25	(**2**)25.67	5.51
Blade alveolar	z	25	25	24	(**5**)24.67	5.30
	c	25	25	25	(**3**)25.00	5.37
	s	17	19	19	18.33	3.94
1.2 Final (Vowel) Errors						
Simple final	ü	16	15	11	14.00	3.01
Compound final	ie	1	0	1	0.67	0.14
	üe	5	5	4	4.67	1.00
Nasal	ng	3	3	1	2.33	0.50
	an	1	1	1	1.00	0.21
	üan	8	8	5	7.00	1.50
	ün	4	4	1	3.00	0.64
Retroflex	er	21	19	18	19.33	4.15
1.3 Tone Errors	Rising Tone	3	3	5	3.67	0.79
	Falling-rising Tone	25	24	23	(**6**)24.00	5.15
	Light Tone	5	5	6	5.33	1.14
2. Words (Lexical errors)		7.05				
2.1 lexis with equivalent morphemes		8	7	8	7.67	1.65
2.2 added affixes		6	6	6	6.00	1.29
2.3 lack of morphemes		12	11	12	12	2.58
2.4 morpheme order errors		7	7	7	7.00	1.53
3. Models(Grammar errors)		4.08				
3.1 "的 de" phrase		19	19	19	19.00	4.08
4. Sentences (Pragmatic errors)		13.75				
4.1 pronunciation errors		39	37	41	(**1**) 39.00	8.38
4.2 greetings		4	4	4	4.00	0.86
4.3 thanks or apologies		21	21	21	21.00	4.51
Total		478	477	451	465.66	100

Figure 4.1 shows the data analyzing result of pretest that is evaluated by error analysis. Pronunciation errors in the red rectangle are proved the main language errors of 26 P2 students. It shows that Pronunciation Errors include Initial Errors (stop and affricative, alveolar, velar, front palatal, retroflex, and blade alveolar), Final Errors (simple final, compound final, nasal, and retroflex) and Tone Errors (rising tone, falling-rising tone, and light tone). Lexical Errors have 4 subtypes, namely words with equivalent morphemes, added affixes, lack of morphemes, and morpheme order errors. Grammar Errors are mainly located in "的 de" phrase. Pronunciation errors, greetings, and thanks or apologies are three subtypes in Pragmatic Errors
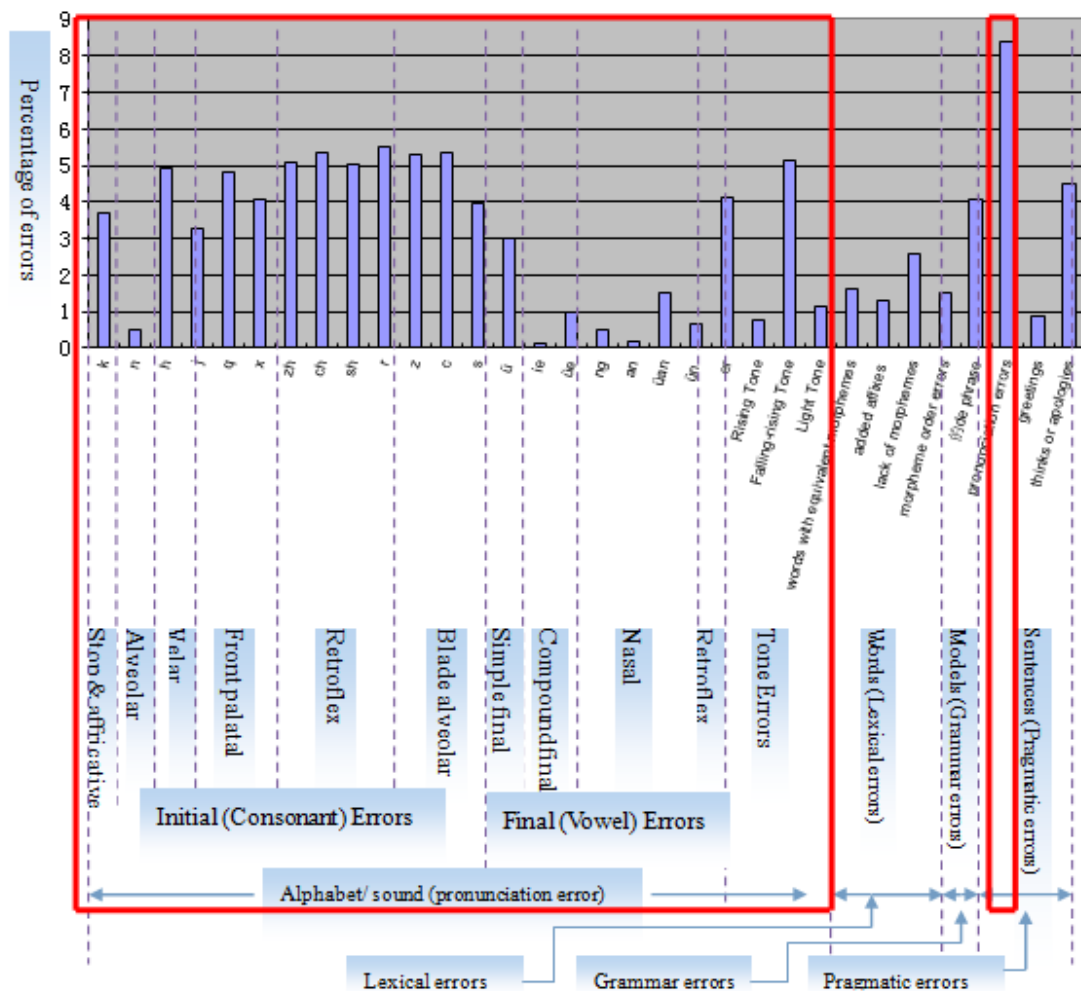

Figure 4.1 Error distribution

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The first six initial alphabets arranged from high-frequency to low-frequency as follows: (1) r, (2) ch, z, c (3) zh, (4) h, sh (5) q, (6) x. And the first three high-frequency final alphabets from high to low are: (1) er, (2) ü, (3) üan. Meanwhile, falling-rising tone is the most difficult tone among the four tones in Chinese. Based on the comparison between Thai language and Chinese language (Appendix E), Thai students frequently make errors in these alphabets as these sounds cannot be found in Thai language.

For consonants, there are 44 consonants in Thai language but 21 sounds totally (Liao, 2008); and there are 23 consonants (initials) in Chinese which also stand for 23 sounds. Through comparing 21 sounds in Thai and 23 sounds in Chinese, there is no same or similar Thai sounds which can match with these Chinese sounds "h", "j", "q", "x", "zh", "ch", "sh", "r", "z", "c", "s". As a result, students feel rather difficult to pronounce them.

About vowels, there are 32 vowels in Thai which stand for 32 sounds (Liao, 2008), and 24 vowels (finals) in Chinese which also stand for 24 sounds. Through a comparison with these sounds, Chinese sound "ü" "er" cannot be found in Thai sounds and their articulation manners are different from Thai sounds'. Therefore, students usually make errors in "ü" as well as its related sounds "üe" "ün" and "er" when they speak.

In terms of tones, both Thai and Chinese are tonal languages, in which the tones distinguish meaning. 5 tones exist in Thai which are middle tone, low tone, falling tone, high tone, and rising tone (Liao, 2008). In Chinese, there are 4 tones, which are level tone, rising tone, falling-rising tone, falling tone, as well as a special light tone. Among these tones' comparison, the rising-falling tone, which is the combination of falling and rising, does not exist in Thai tones. While in Thai language the rising tone and falling tone are separated. This leads to the difficulty for Thai students to grasp this tone.

4.2 Objective two and comparison between pretest and posttest

Objective 2 is to promote Chinese pronunciation abilities of P2 students using Chinese pronunciation incubator. Table 4.2 and figure 4.2 compare pretest with posttest to analyze students' improvement. The posttest results in table 4.2 manifest that 26

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students have a total of 309.67 language errors via error analysis (Liu, 2012). The top six language errors arranged from high frequency to low frequency are (1) blade alveolar "c", (2) retroflex "sh", (3) pronunciation errors, (4) retroflex "er", (5) retroflex "r", (6) "的 de" phrase. Compared to 465.66 language errors of the pretest, the number of language errors reduced by 155.99, or 33.50% in percentage.

Data analysis in Table 4.2 illustrates that most students' spoken Chinese especially Chinese pronunciation is improved, which is proved by the comparison between pretest and posttest. In addition, the number of most language errors decreased after seven-week learning by Chinese pronunciation incubator. This improvement attributes to the effectiveness of Chinese pronunciation incubator:

(1) The learning content is designed based on the pretest result evaluated by error analysis (Liu, 2012) and excellent teaching experience from Chinese teaching expert, which is also focused on the specific problem area of students. Therefore, these contents are highly effective to strengthen students' weakness in spoken Chinese.

(2) Tablets with Bedtime Story application are used as the learning tool, which motivate students' learning interest. Students can use it to develop their own understanding and cognition towards Chinese language learning, especially Chinese pronunciation, not only in class but also after class. Moreover, students get more chance to listen to and imitate the professional Chinese via tablets.

(3) In this constructionist learning environment, students work primarily in groups and knowledge are interactive and dynamic. There is a great emphasis on social communication, as well as collaboration and exchange of ideas. This is contrary to the traditional classroom in which students work primarily alone, learning is achieved through repetition.

(4) Teaching activities, such as group collaborating, share, feedback, and frequent review lesson, play an important role to improve students' spoken Chinese level. These activities provide students good chances to learn from each other, to correct language errors by themselves, to review previous knowledge and to learn new knowledge.

Students achieve an improvement of most error types, however they still have difficulty in six categories, namely "的 de" phrase, retroflex 'er', simple final 'ü', front palatal 'x', blade alveolar 'c' and retroflex 'sh'. The reasons are explained as follows.

The influences from language interference. According to Dai (2010), language interference contains interlingual errors and intralingual errors. The interlingual errors are mainly caused by cross-linguistic interference at different levels such as phonological, lexical, grammatical or discoursal, etc. The intralingual errors mainly result from faulty or partial learning of the target language, which is independent of the native language. For P2 students, their language errors are mainly caused by interlingual errors, as they are Chinese language beginners. The similarities between Chinese language and Thai language will facilitate target language learning, which is called positive transfer. However, the differences between Thai language and Chinese language will interfere target language learning. In Thai language, there is not a similar sound with 'er', 'ü', 'x', 'c' and 'sh', and the word order of "的 de" phrase is exactly contrary to Chinese language.

Table 4.2 The number of language errors in the pretest and posttest

Error Type		Pretest Average No. of errors	Posttest Average No. of errors	Improvement (Pre-Post)	
				Raw difference	% difference
1. Alphabet/ sound (pronunciation error)					
1.1 Initial (Consonant) Errors					
Stop and affricative	k	17.33	9.67	7.66	44.22%
Alveolar	n	2.33	0.00	2.33	100.00%
Velar	h	23.00	9.67	13.33	57.97%
Front palatal	j	15.33	10.00	5.33	34.77%
	q	22.33	15.00	7.33	32.83%
	x	19.00	20.33	-1.33	-7.02%
Retroflex	zh	23.67	17.67	6.00	25.36%
	ch	(4)25.00	20.67	4.33	17.33%
	sh	23.33	(2)23.33	0.00	-0.01%
	r	(2)25.67	(5)21.33	4.34	16.89%
Blade alveolar	z	(5) 24.67	11.00	13.67	55.41%
	c	(3)25.00	(1)25.00	0.00	0.00%
	s	18.33	10.67	7.66	41.81%

Table 4.2 The number of language errors in the pretest and posttest (Continued)

| Error Type		Pretest Average No. of errors	Posttest Average No. of errors	Improvement (Pre-Post)	
				Raw difference	% difference
1.2 Final (Vowel) Errors					
Simple final	ü	14.00	15.67	-1.67	-11.90%
Compound final	ie	0.67	0.00	0.67	100.00%
	üe	4.67	1.00	3.67	78.59%
Nasal	ng	2.33	0.00	2.33	100.00%
	an	1.00	0.00	1.00	100.00%
	üan	7.00	2.00	5.00	71.43%
	ün	3.00	1.00	2.00	66.67%
Retroflex	er	19.33	(4)21.33	-2.00	-10.36%
1.3 Tone Errors	Rising Tone	3.67	0.00	3.67	100.00%
	Falling-rising Tone	(6)24.00	10.67	13.33	55.56%
	Light Tone	5.33	1.00	4.33	81.24%
2. Words (Lexical errors)					
2.1 lexis with equivalent morphemes		7.67	2.00	5.67	73.92%
2.2 added affixes		6.00	1.00	5.00	83.33%
2.3 lack of morphemes		12.00	4.00	8.00	66.67%
2.4 morpheme order errors		7.00	1.00	6.00	85.71%
3. Models(Grammar errors)					
3.1 "的 de" phrase		19.00	(6)21.00	-2.00	-10.53%
4. Sentences (Pragmatic errors)					
4.1 pronunciation errors		(1)39.00	(3)21.67	17.33	44.44%
4.2 greetings		4.00	0.00	4.00	100.00%
4.3 thanks or apologies		21.00	12.00	9.00	42.86%
Total		465.66	309.67	155.99	33.50%
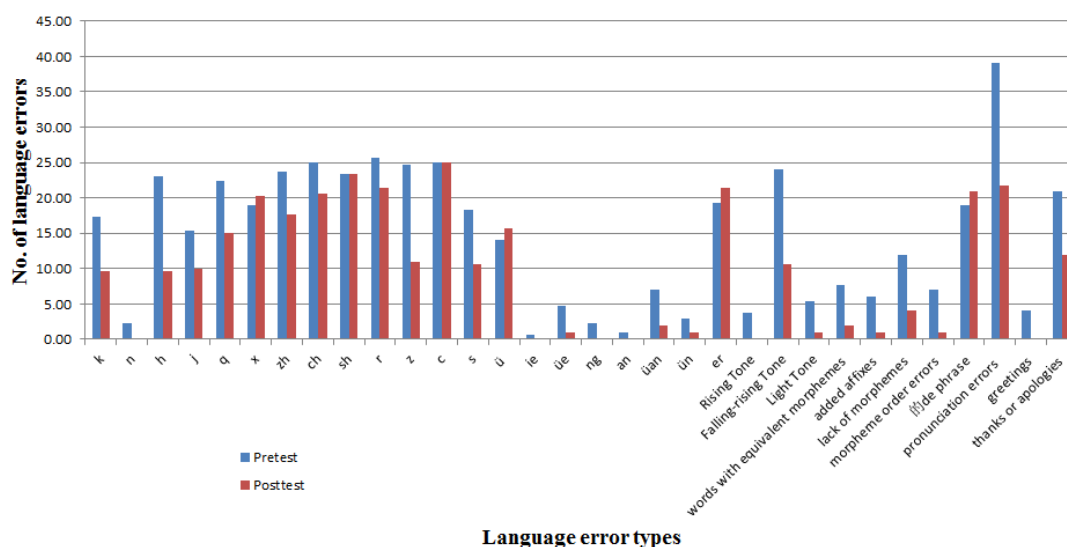
Figure 4.2 Comparison between pretest and posttest

Second language acquisition is different from first language acquisition, and the second language learners generally fail to attain native-like competence. The language they produce is called interlanguage or learner language, which tends to be stabilized or fossilized at certain level (Dai, 2010). Therefore, language errors are inevitable for second language learners. And these language errors are beneficial in second language acquisition, as they remind students what weakness they have, and students are able to achieve a higher level if they can correct these errors.

4.3 Objective three and retention test

Objective three aims to evaluate P2 students' Chinese pronunciation abilities utilizing error analysis. The 2nd semester of P2 students were completed after the posttest, then followed by a 2-month summer class. In order to decrease the forgetting rate, the review lessons were added to the teaching syllabus during this 2-month summer class. This retention test was taken after the summer class. Table 4.3 analyzes the average forgetting rate of 26 students by

Table 4.3 Comparison between posttest and retention test

Error Type		Retention test Average No. of errors	Posttest Average No. of errors	forgetting (Reten-Post)	
				Raw difference	% difference
1. Alphabet/ sound (pronunciation error)					
1.1 Initial (Consonant) Errors					
Stop and affricative	k	13.33	9.67	3.67	27.50%
Alveolar	n	4.67	0.00	4.67	100.00%
Velar	h	15.67	9.67	6.00	38.30%
Front palatal	j	13.33	10.00	3.33	25.00%
	q	18.00	15.00	3.00	16.67%
	x	18.67	20.33	-1.67	-8.93%
Retroflex	zh	20.33	17.67	2.67	13.11%
	ch	(6)21.33	20.67	0.67	3.12%
	sh	20.67	(2)23.33	-2.67	-12.90%
	r	(4)23.00	(5)21.33	1.67	7.25%
Blade alveolar	z	16.33	11.00	5.33	32.65%
	c	(2)23.33	(1)25.00	-1.67	-7.14%
	s	13.00	10.67	2.33	17.95%
1.2 Final (Vowel) Errors					
Simple final	ü	13.67	15.67	-2.00	-14.63%
Compound final	ie	5.00	0.00	5.00	100.00%
	üe	9.00	1.00	8.00	88.89%
Nasal	ng	3.33	0.00	3.33	100.00%
	an	7.00	0.00	7.00	100.00%
	üan	6.33	2.00	4.33	68.42%
	ün	8.33	1.00	7.33	88.00%
Retroflex	er	(5)22.33	(4)21.33	1.00	4.48%
1.2 Tone Errors	Rising Tone	2.33	0.00	2.33	100.00%
	Falling-rising Tone	19.00	10.67	8.33	43.86%
	Light Tone	4.33	1.00	3.33	76.92%

Table 4.3 Comparison between posttest and retention test (Continued)

Error Type	Retention test Average No. of errors	Posttest Average No. of errors	forgetting (Reten-Post)	
			Raw difference	% difference
2. Words (Lexical errors)				
2.1 lexis with equivalent morphemes	6.00	2.00	4.00	66.67%
2.2 added affixes	4.00	1.00	3.00	75.00%
2.3 lack of morphemes	7.00	4.00	3.00	42.86%
2.4 morpheme order errors	5.00	1.00	4.00	80.00%
3. Models(Grammar errors)				
3.1 "的 de" phrase	(3)23.00	(6)21.00	2.00	8.70%
4. Sentences (Pragmatic errors)				
4.1 pronunciation errors	(1)30.67	(3)21.67	9.00	29.35%
4.2 greetings	2.00	0.00	2.00	100.00%
4.3 thanks or apologies	16.00	12.00	4.00	25.00%
Total	416.00	309.67	106.33	25.56%
Average forgetting rate	35.56%	26.48%		

Comparing posttest and retention test. It denotes that the total error number of the posttest is 309.67 with 26.48% average forgetting rate, the total error number of retention test is 416.00 with 35.56% average forgetting rate. In the retention test, the top six language errors arranged from high frequency to low frequency are (1) pronunciation errors, (2) blade alveolar "c", (3) "的 de" phrase, (4) retroflex "r", (5) retroflex "er", (6) retroflex "ch".

To show the obvious gap of memory retention between posttest and retention test, figure 4.3 is made from data of retention tests. It is divided into two groups. Group one (inside of purple rectangle) is the part with a small gap between two tests, which proves that P2 students have a low forgetting rate in this part. Group two (inside of green rectangle) is the other part with a bigger gap between these two tests, which denotes that P2 students have a high forgetting rate in this part. The reasons why P2 students have a low forgetting rate in group one but a high forgetting rate in group two will be explained as follows.
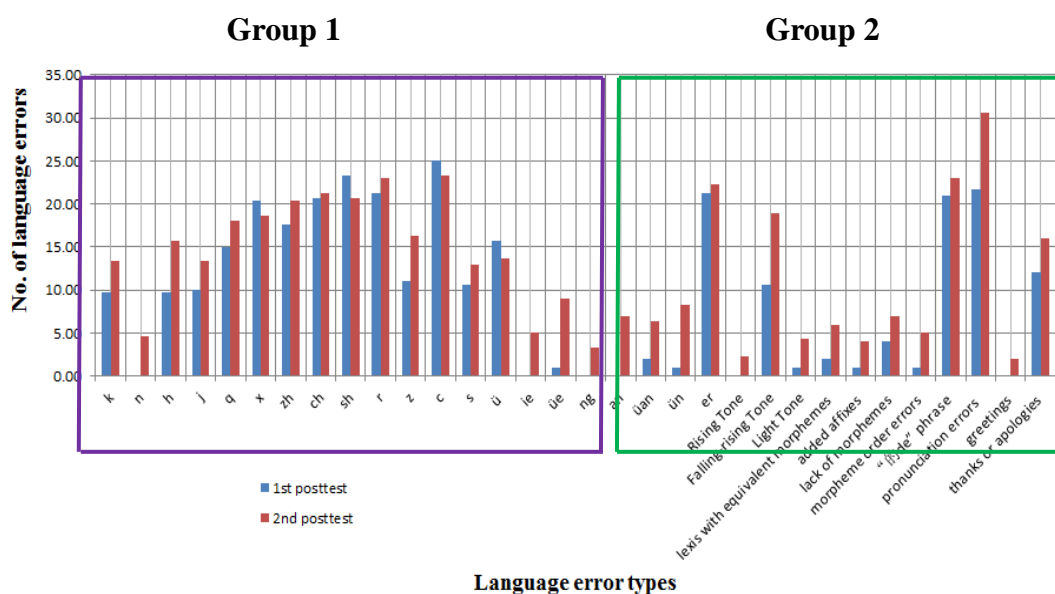
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Figure 4.3 comparison of posttest and retention test

The low forgetting rate of group one is due to two main causes. The first cause is explained from the perspective of language acquisition, and the second cause is presented from a long-term memory perspective.

In terms of language acquisition, group one consists of initials (consonants) and simple finals (vowels), which are the smallest and simplest unit of Chinese pinyin (alphabets). According to language acquisition, all human languages possess a hierarchical structure, which ranges from the fundamental sounds of speech to the more complex levels of spoken conversation, namely phonemes, morphemes, words, phrase and sentence (Nairne, 2009). Phonemes are at the bottom of the spoken language hierarchy, which is defined as the smallest significant sound units in speech. In terms of Chinese language, these initials (consonants) and simple finals (vowels) belong to the phoneme stage. P2 students are around 6 or 7 years old, their comprehension ability towards a foreign language mainly stays at phoneme stage. In accordance with the Basic Education Core Curriculum (2013), the core teaching contents of P2 students' foreign language speaking are alphabet, sounds, simple words /sentences, models. Alphabets and sounds match with P2 students' comprehension ability. Simple words, simple sentences and models are beneficial for students to practice these alphabets and sounds, which also lay the foundation for further learning in a higher grade.

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In accordance with long-term memory (Plotnik and Kouyoumdjian, 2014), most researchers agree that there are two memory systems. One system stores limited information for a brief period of time, which is called short-term memory. The other system stores a large amount of information for very long period of time, which is called long-term memory. In the process from short-term memory to long-term memory, primacy effect plays an important role. The primacy effect refers to better recall, or improvement in retention, of information presented at the beginning of a body of information. For example, one animals' name list is given: bear, giraffe, wolf, fly, deer, elk, gorilla, elephant, frog, snail, turtle, shark, ant, and owl. After reading this list of names, immediately write down as many of the animals' name as you can remember. It is more easily for participants to recall the first four or five items (bear, giraffe, wolf, fly) as they have more time to rehearse the first words presented. As a result of constant rehearsing, these first names are transferred to and storied in long-term memory. In addition, they are available to recall from the long-term memory system. In the Chinese pronunciation incubator of this research, the teaching content of each lesson is arranged from simple alphabets and compound alphabets to words, models and sentences. As a result of this primacy effect, it is reasonable that simple alphabets (initials and simple finals) are better recalled than other parts. Because students have more time to rehearse these simple alphabets at the beginning of Chinese lessons, which increases the chances of transferring these items into long-term memory.

As a special case, several items' forgetting rate of retention test is lower than that of posttest, such as "x", "sh", "c" and "ü". As more errors (over 15 errors) are found to exist in "x", "zh" "ch","sh", "r", "c" and "ü" than that of other items in the posttest, these alphabets are then the key point in review lessons during the summer class. The improvement on "x", "sh", "c" and "ü" is largely due to the continuous review lessons.

The causes of high forgetting rate of group two are analyzed from the perspective of language acquisition and long-term memory system.

From the perspective of language acquisition (Nairne, 2009), group two contains compound finals (compound vowels), words, sentence models and simple sentences, which are more complicated to grasp. Compound finals are composed by at least two alphabets, for example, "ie" is formed by two simple finals "i" and "e", "an" is composed of one simple final "a" and one initial "n", "üan" consists of three alphabets,

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namely two simple finals "ü" "a" and another initial "n". Words' pronunciation is a mixture of finals, initials and tones. Words and grammar combine to be sentence models and simple sentences. P2 students are familiar with simple single alphabets at this stage; it will take time for them to comprehend compound finals, words, sentence models and sentences. As a result, the forgetting rate of group two is higher than that of group one, even though these contents are still added to the review lessons during summer class.

From the perspective of long-term memory (Plotnik and Kouyoumdjian, 2014), participants do not recall many items form the middle of the list (gorilla, elephant, frog) because they do not have much time to rehearse these items. When participants try to remember middle items, their attention and time are split to do two things at the same time, to remember the previous items and to rehearse new ones. Less rehearsal leads to less storage of middle items in long-term memory. In this paper, the teaching content of each lesson is arranged from simple alphabets and compound alphabets to words, models and sentences. The high forgetting rate of words in group two is due to this middle position effect. Students forget these words faster because they do not have enough time to rehearse these items. In group two, the forgetting rate of sentences is lower than that of words, which is resulted in the recency effect. The recency effect means better recall or improvement in retention, of information presented at the end of a body of information. It is easier for participants to recall the last four or five items of the list because these items are still stored in their short-term memory. And continuous rehearsal of these items contributes to encode and store them in the long-term memory. In this research, sentences are taught at the end of the class, which are easier to store in students' short-term memory. And the frequent review lessons and daily communication demand increase the rehearsal of these sentences. As a result, these sentence are easier for students to remember and recall.