



CHAPTER FOUR

RESULTS

This chapter aims to present the results of the study and is organized in response to research questions as stated in Chapter One. First, the results of pausal units from participants' recalls are analyzed to compare the effects of comic strip and the effects of sequencing comic strips on EFL reading comprehension. Second, the results of inferences from participants' recalls are analyzed to compare the effects of the comic strip and the effects of sequencing comic strips on EFL inference generation. Finally, questionnaires and interviews on students' perceptions toward comic strips and sequencing of comic strips are described.

Results of the Effect of Comic Strips and the Effects of Sequencing Comic Strips on Written Recall

This section answers research questions 1: "What is the effect of comic strips on EFL students' reading comprehension as indicated by recall?" and research question 2: "What is the effect of the sequencing comic strips on EFL students' reading comprehension indicated by recall?" The results are given as follows.

Effects of Comic Strips on Written Recall

To compare the effects of comic strips and the effects of sequencing comic strips on recall, ANOVA analysis was performed. The independent variable is Group and the dependent measure is Recall. The means and standard deviation of the written recall of Control Group and three Experimental Groups are listed in Table 2.

Table 2

Descriptive Statistics for the Written Recall of Four Groups

| | GROUP (N = 144) | | | |
|------|---------------------|-----------------|--------------------|------------------|
| | Control (n = 35) | Pre (n = 35) | During (n = 37) | Post (n = 37) |
| Mean | 15.20 (11.27) | 19.08 (9.7) | 23.08 (9.19) | 18.29 (9.22) |

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

In Table 2, the three Experimental Groups all had higher means than Control Group. The mean scores of written recall indicated student performance as lowest in Control Group (M = 15.20), higher with Post-reading Group (M = 18.29) and Pre-reading Group (M = 19.08), and highest with During-reading Group (M = 23.08). Test of Homogeneity of variance among the four groups ($p > .05$) indicated normal distribution of scores. The results of one-way ANOVA (see Table 3) showed that there was a significant difference among the four groups on the written recall, $F(3, 140) = 3.891, p < .05$, and shown in Table 3.

Table 3

ANOVA Summary for Written Recall

| | SS | df | MS | F | <i>p</i> |
|----------------|-----------|-----|---------|-------|----------|
| Between Groups | 1139.997 | 3 | 379.999 | 3.891 | .010* |
| Within Groups | 13671.329 | 140 | 97.652 | | |

* $p < .05$

Post hoc analysis of ANOVA on the written recall for the four groups were performed with LSD pairwise comparison. Table 4 shows the results of LSD post hoc

analysis which revealed that only During-reading Group (M = 23.08) performed significantly better than Control Group (M =15.20). The effect size is 7.88 (SD = 2.33). The other two Experimental Groups, though having higher mean scores than Control Group, did not reach significant differences in comparison with Control Group. Thus, reading texts with comic strip simultaneously facilitated the recall after reading, but presenting the comic strip before and after the text reading did not significantly enhance the recall.

Table 4

LSD Pairwise Comparison for the Written Recall of Four Groups

| | GROUP (N=144) | | | |
|---------------------|---------------|--------------|---------------|--------------|
| | Control | Pre. | During | Post. |
| Control (n = 35) | | -3.88 (2.36) | -7.88 (2.33)* | -3.09 (2.33) |
| Pre. (n = 35) | 3.88 (2.36) | | -3.99 (2.33) | .78 (2.33) |
| During (n = 37) | 7.88 (2.33)* | 3.99 (2.33) | | 4.78 (2.29)* |
| Post. (n = 37) | 3.09 (2.33) | -.78 (2.33) | -4.78 (2.29)* | |

* $p < .05$

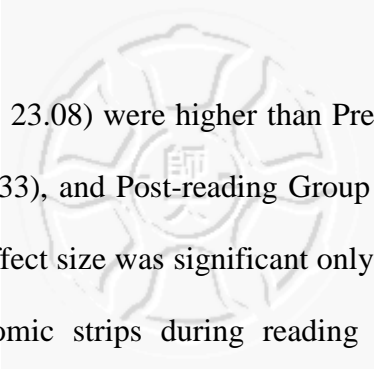
Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

Effects of Sequencing of Comic Strips on Written Recall

Whether the temporal order of comic strip presentation affect reading comprehension could also be indicated in Table 4. Although the mean scores of



During-reading Group ($M = 23.08$) were higher than Pre-reading Group ($M = 19.08$) with the effect size 3.09 (2.33), and Post-reading Group ($M = 18.29$) with the effect size 4.78 ($SD = 2.29$), the effect size was significant only with Post-reading Group. In other words, presenting comic strips during reading facilitate recall better than presenting it after reading, but no better than presenting it before reading.

Results of Effects of Comic Strips and the Effects of Sequencing

Comic Strips on Inference Generation

This section answers research questions 3: “What is the effect of comic strips on EFL students’ inference generation as indicated by recall?” and research question 4: “What is the effect of sequencing comic strip on EFL students’ inference generation as indicated by recall?” The results of two types of inferences, text-based and reader-based inferences, are based on the mismatch between the recall and the original text. These are the ideas that do not match the original text but are in line with textual development. Those units that mismatched but misrepresented the text, (Chu, 2002), were not included for analysis.

Effect of Comic Strips on Text-based Inference

To examine effects of comic strip and effects of sequencing comic strip on text-based inferences, ANOVA analysis was performed. The independent variable is Group while the dependent variable is Text-based inferences. Table 5 gives the mean scores and standard deviation of text-based inferences generated by Control Group and the three Experimental Groups.

Table 5

Descriptive Statistics for the Text-Based Inference of the Four Groups

| | GROUP(N = 144) | | | |
|------|---------------------|-----------------|--------------------|------------------|
| | Control (n = 35) | Pre (n = 35) | During (n = 37) | Post (n = 37) |
| Mean | .45 (.65) | 1.82 (1.18) | 1.18 (.98) | 2.04 (1.27) |

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

As shown in Table 5, on average, students in the three Experimental Groups generated more text-based inferences than those in Control Group. Mean units from the highest to the lowest are: Post-reading ($M = 2.04$), Pre-reading ($M = 1.82$), During-reading ($M = 1.18$), and Control ($M = .45$). A one-way ANOVA analysis for text-based inferences (see Table 6) indicated that there is a significant difference among four groups, $F(3, 140) = 16.20, p < .05$.

Table 6

ANOVA Summary for Text-Based Inference

| | SS | df | MS | F | <i>p</i> |
|----------------|---------|-----|-------|-------|----------|
| Between Groups | 54.37 | 3 | 18.11 | 16.20 | .00* |
| Within Groups | 156.522 | 140 | 1.118 | | |

* $p < .05$

Post hoc comparisons were performed to compare the differences among the four groups on text-based inferences. Table 7 shows that students in each Experimental Group significantly generated more text-based inferences than those in Control Group. That means students reading text with comic strips, no matter in what temporal order,

performed better than reading without on the generation of text-based inferences. The effect size between Pre-reading and Control is 1.37 (SD = .25), between During-reading and Control is .73 (SD = .24), and that between Post-reading and Control is 1.58 (SD = .24) respectively.

Effect of Sequencing of Comic Strips on Text-based Inference

Table 7

LSD Pairwise Comparison for the Text-Based Inference of Four Groups

| | GROUP (N = 144) | | | |
|---------------------|-----------------|--------------|-------------|--------------|
| | Control | Pre. | During | Post. |
| Control (n = 35) | | -1.37 (.25)* | -.73 (.24)* | -1.58 (.24)* |
| Pre. (n = 35) | 1.37 (.25)* | | .63 (.24)* | -.21 (.24) |
| During (n = 37) | .73 (.24)* | -.63 (.24)* | | -.85 (.24)* |
| Post. (n = 37) | 1.58 (.24)* | .21 (.24) | .85 (.24)* | |

* $p < .05$

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

Table 5 showed the sequencing of comic strip presentation had an effect on the generation of text-based inferences. Readers generated significantly more inferences when comic strips were presented either before (M = 1.82) or after (M = 2.04) than presented during reading (M = 1.18). The effect size between During-reading and Pre-reading is .63 (SD = .24) while the effect size between During-reading and

Post-reading is .85 (SD = .24). However, there is no difference between Pre-reading and Post-reading in the generation of text-based inferences. That means comic strips presented before or after the text can help students generate more text-based inferences than presented during reading. Sequencing of comic strips presentation plays a role on students' generation of text-based inferences.

Effect of Comic Strips on Reader-based Inference

To examine effects of comic strips and effects of sequencing comic strips on reader-based inferences, ANOVA analysis was performed. The independent variable is Group while the dependent variable is Reader-based inferences. Mean scores and standard deviation of the four groups are shown in Table 8.

Table 8

Descriptive Statistics for the Reader-Based Inference of the Four Groups

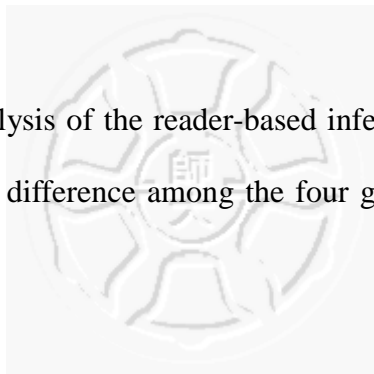
| | GROUP(N = 144) | | | |
|------|---------------------|-----------------|--------------------|------------------|
| | Control (n = 35) | Pre (n = 35) | During (n = 37) | Post (n = 37) |
| Mean | .42 (.55) | 1.27 (1.46) | 1.22 (.99) | 1.36 (1.10) |

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

The results shown in Table 8 indicated that the students in the three Experimental Groups score higher than Control Group in the generation of reader-based inferences. Mean Scores of four groups from the highest to the lowest were: Post-reading (M = 1.36), Pre-reading (M = 1.27), During-reading (M = 1.22), and Control (M = .42).



Moreover, the ANOVA analysis of the reader-based inferences (see Table 9) showed that there was a significant difference among the four groups, $F(3, 140) = 5.721, p < .05$.

Table 9

ANOVA Summary for Reader-Based Inference

| | SS | df | MS | F | <i>p</i> |
|----------------|---------|-----|-------|-------|----------|
| Between Groups | 19.967 | 3 | 6.656 | 5.721 | .001* |
| Within Groups | 162.864 | 140 | 1.163 | | |

* $p < .05$

Post hoc comparisons were performed, using LSD analysis, to compare the differences in the production of reader-based inferences among the four groups. Table 10 indicated that the mean score of each Experimental Group was significantly higher than that of Control Group. The effect size between Pre-reading and Control was .84 (SD = .25), between During-reading and Control was .80 (SD = .25), and between Post-reading and Control was .93 (SD = .25). Thus, students generated significantly more reader-based inferences when reading with comic strips than without, no matter at which temporal order the comic strip was presented.

Table 10

LSD Pairwise Comparison for the Reader-Based Inference of Four Groups

| | GROUP (N=144) | | | |
|---------------------|---------------|-------------|-------------|-------------|
| | Control | Pre | During | Post |
| Control (n = 35) | | -.84 (.25)* | -.80 (.25)* | -.93 (.25)* |
| Pre (n = 35) | .84 (.25)* | | .04 (.25) | -.09 (.25) |
| During (n = 37) | .80 (.25)* | -.04 (.25) | | -.13 (.25) |
| Post (n = 37) | .93 (.25)* | .09 (.25) | .13 (.25) | |

* $p < .05$

Note. 1. Control = Control Group; Pre = Pre-reading Group;

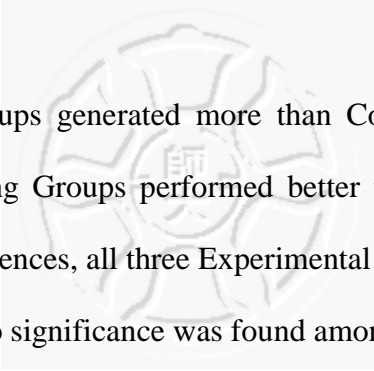
During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

Effect of Sequencing Comic Strips on Reader-based Inference

Table 10 also shows the results of LSD post hoc analysis of all groups and illustrates which temporal order of comic strips presentation has robust effects on reader-based inferences. There was no significant difference for each pair of comparison among the three Experimental Groups. That means the sequencing of comic strip presentation does not differentiate the outcomes of students' generation of reader-based inferences.

To sum up, effects of the comic strip and its sequencing of presentation have been shown on students' recall and generation of text-based and reader-based inferences. First, for recall, only students in During-reading Group outperformed students in Control Group and Post-reading Group. Second, for text-based inferences,



all three Experimental Groups generated more than Control Group. Besides, both Post-reading and Pre-reading Groups performed better than During-reading Group. Third, for reader-based inferences, all three Experimental Groups generated more than Control Group. However, no significance was found among Experimental Groups.

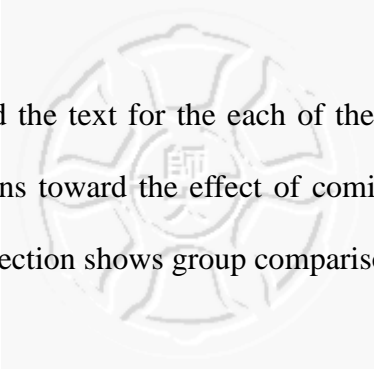
Students' Perception toward the Comic Strip and the Sequencing of Its Presentation

This section responds to research question 5: “What are students’ perceptions toward the effects of comic strip and different sequencing of its presentation?” Data were collected from two parts: Questionnaires and Interviews. Results from Part A (Questions 1-3) in Questionnaire, background information, are described in the Participant Section in Chapter Three. Results from Part B (Question 4-11) in Questionnaire are presented in this section. These eight questions investigate students’ perceptions toward the reading text and the effect of comic strips on their reading, using a five-level Likert scale. Mean scores were used to compare and analyze statistically.

Results from Interview are the responses of the students from three Experimental Groups, showing their perceptions of different sequencing of comic strip presentation on their reading recall and inference generation. Five students of each Experimental Group participated in the Interview, yielding 15 students’ responses for transcription and discussion.

Results of Written Questionnaire

Results of questionnaires are reported in two parts below: Questions 4~6 on



students' perceptions toward the text for the each of the four groups, and Questions 7~11 on students' perceptions toward the effect of comic strip for each of the three experimental groups. Each section shows group comparisons by statistical analysis.

Effect of Comic Strips on Three Text Perceptions

Table 11 below shows students' perceptions toward text interest, text difficulty, and mental imagery. All groups responded to these questions. Three rounds of ANOVA analyses was run on each question to compare differences among groups, with group as an independent variable and rating score as a dependent variable. Students across four groups have moderate ratings for text perceptions: $M = 3.35$ for text interest, $M = 3.13$ for text difficulty, and $M = 3.34$ for mental imagery, indicating the appropriateness of text selection. Yet there existed group differences in text interest (Question 4): $F(3, 140) = 8.45, p < .05$, and in mental imagery (Question 6): $F(3, 140) = 4.45, p < .05$. (see Table 11), although there is no difference in perception of text difficulty among groups.

Post hoc comparisons among the four groups show significance between Control and Experimental Groups (see Table 12). First, with text interest, all three Experimental Groups scored significantly higher than Control Group. The effect size between Pre-reading and Control is $.94$ ($SD = .19$), between During-reading and Control is $.63$ ($SD = .18$), and between Post-reading and Control is $.60$ ($SD = .18$). Second, with text difficulty, there was only an effect between During-reading and Control with the effect size of $.39$ ($SD = .19$). Third, with mental imagery, only two Experimental Groups, Pre-reading and During-reading, scored higher than Control Group. The effect size between Pre-reading and Control is $.77$ ($SD = .25$) while the effect size between During-reading and Control is $.59$ ($SD = .24$).

Table 11

ANOVA Results: Students' Perception toward the Reading Text

| Perception | Group | N | Mean | F |
|--|---------|-----|-------------|--------|
| Q4. Was the text interesting to you? | Control | 35 | 2.80 (.93) | 8.453* |
| | Pre | 35 | 3.74 (.78) | |
| | During | 37 | 3.43 (.83) | |
| | Post | 37 | 3.41 (.64) | |
| | Total | 144 | 3.35 (.86) | |
| Q5. Was it difficult for you to comprehend the text? | Control | 35 | 3.37 (.97) | 1.60 |
| | Pre | 35 | 3.06 (.72) | |
| | During | 37 | 2.97 (.49) | |
| | Post | 37 | 3.14 (.94) | |
| | Total | 144 | 3.13 (.81) | |
| Q6. Was there any images emerging in your mind when you read the text? | Control | 35 | 2.97 (1.12) | 4.54* |
| | Pre | 35 | 3.74 (1.06) | |
| | During | 37 | 3.57 (1.04) | |
| | Post | 37 | 3.08 (.93) | |
| | Total | 144 | 3.34 (1.09) | |

* $p < .05$

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

Effects of the Sequencing of Comic Strips Presentation on Three Text Perceptions

Post hoc comparisons among Experimental groups were performed, using LSD analysis, on the ratings of text interest and text imagery. Table 11 also shows that on text interest (Q4), the mean scores of the three Experimental Groups from the highest to the lowest were: Pre-reading (M = 3.74), During-reading (M = 3.43), and Post-reading (M = 3.41). However, the perceptions of text interest among the three groups are equally high no matter when the comic strip was presented. That is, the

addition of comic strip significantly makes reading the text more interesting.

Table 12

LSD Post Hoc Comparison of Students' Text Perceptions

| Perception | GROUP | | | | |
|---------------------|---------|-------------|-------------|-------------|-------------|
| | GROUP | Control | Pre. | During | Post. |
| Q4. text interest | Control | | -.94 (.19)* | -.63 (.18)* | -.60 (.18)* |
| | Pre | .94 (.19)* | | .31 (.18) | .33 (.18) |
| | During | .63 (.18)* | .31 (.18) | | .02 (.18) |
| | Post | .60 (.18)* | -.33 (.18) | -.02 (.18) | |
| Q5. text difficulty | Control | | .31 (.19) | .23 (.19)* | -.31 (.19) |
| | Pre | -.31 (.19) | | .08 (.19) | -.07 (.19) |
| | During | -.39 (.19)* | -.08 (.19) | | -.16 (.18) |
| | Post | -.23 (.19) | .07 (.19) | .16 (.18) | |
| Q6. mental imagery | Control | | -.77 (.25)* | -.59 (.24)* | .11 (.24) |
| | Pre | .77 (.25)* | | .17 (.24) | .66 (.24)* |
| | During | .59 (.24)* | -.17 (.24) | | .48 (.24)* |
| | Post | .11 (.24) | -.66 (.24)* | -.48 (.24)* | |

* $p < .05$

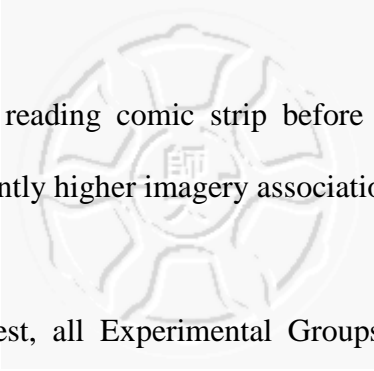
Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

As for text difficulty, group comparison did not show significance among the three experimental groups. That is, sequencing comic strip is not a factor on student' perception of text difficulty.

Follow-up comparisons among the three experimental groups on text imagery indicated that Pre-reading Group (M = 3.74) and During-reading Group (M = 3.57) ranked higher in mental imagery association than Post-reading Group (M =3.08).



These results indicate that reading comic strip before and during the text helped participants induce significantly higher imagery association than those of Post-reading Group.

In sum, for text interest, all Experimental Groups rated higher than Control Group. For text difficulty, Control Group rated higher than During-reading Group. For mental imagery, Pre-reading and During-reading Groups scored higher than Control Group and Post-reading Group respectively.

Perceptions toward the Effects of Comic Strips among Three Experimental Groups

Only the three Experimental Groups responded to Questions 7-11, which aimed to probe students' perceptions of the effects of comic strips on their reading experience. These questions were about whether reading with comic strip helpful to students' willingness (Question 7), guessing of unknown words (Question 8), comprehension (Question 9), memorization of the story (Question 10), and speed of reading (Question 11). Table 13 showed the outcome of data analysis. Overall students' perceptions on these questions, rating between 3.75 and 4.31, were mid to mid-high. However, there were not any significant differences among these groups. That means students who read comic strips hold positive attitudes toward the effect of comic strip on their reading, in whatever sequence the comic strip was presented. Comic strips facilitated their willingness to read, guessing of unknown words, comprehension, memorization, and speed of reading.

Table 13

ANOVA Results: Students' Perception toward the Effects of Comic Strips

| Perception | Group | N | Mean | F |
|---|--------|-----|-------------|------|
| Q7. Was reading the text with comic strips helpful to your willingness of reading the text? | Pre | 35 | 4.14 (.84) | 1.36 |
| | During | 37 | 3.81 (.84) | |
| | Post | 37 | 3.94 (.88) | |
| | Total | 109 | 3.96 (.85) | |
| Q8. Was reading the text with comic strips helpful to your guessing of unknown words? | Pre | 35 | 3.88 (.99) | .18 |
| | During | 37 | 3.86 (1.00) | |
| | Post | 37 | 3.75 (.95) | |
| | Total | 109 | 3.83 (.97) | |
| Q9. Was reading the text with comic strips helpful to your reading comprehension? | Pre | 35 | 4.25 (.70) | .26 |
| | During | 37 | 4.13 (.67) | |
| | Post | 37 | 4.21 (.78) | |
| | Total | 109 | 4.20 (.71) | |
| Q10. Was reading the text with comic strips helpful to your memorization of the story? | Pre | 35 | 4.31 (.67) | 1.13 |
| | During | 37 | 4.10 (.77) | |
| | Post | 37 | 4.05 (.84) | |
| | Total | 109 | 4.15 (.77) | |
| Q11. Was reading the text with comic strips helpful to your speed of reading? | Pre | 35 | 3.94 (.99) | .52 |
| | During | 37 | 4.08 (.82) | |
| | Post | 37 | 3.86 (.91) | |
| | Total | 109 | 3.96 (.91) | |

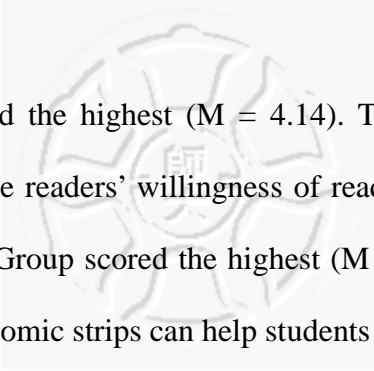
* $p < .05$

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Standard Deviations are presented in the parenthesis.

Some interesting findings of Table 13 are described below. First, the results of Q9 and Q10 were quite positive—all groups had a higher mean score than 4. That means reading the text with comic strips is very helpful to readers' reading comprehension and memorization of the story. Second, for the results of Q7, students



in Pre-reading Group scored the highest ($M = 4.14$). That is, reading comic strips before the text can best raise readers' willingness of reading the English text. Third, students in During-reading Group scored the highest ($M = 4.08$) in Q11. That means reading the text along with comic strips can help students finish reading faster.

Results of Perception Interview

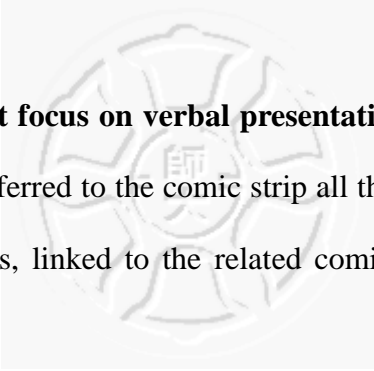
The purpose of post-treatment interview is to investigate students' perceptions toward the comic strip in different sequencing of its presentation. Students in the three Experimental Groups participated in the interview. Five students in each Experimental Group were interviewed, and a total of 15 responses were recorded and analyzed qualitatively. Three questions were asked for each groups, regarding the effect of comic strips on text comprehension, referential processing of reading, and effect of comic strips on text recall. The results of students' responses are shown as follows.

Responses from Pre-reading Group

Question One. When asked “**Did pre-reading comic strip help your comprehension of the text,**” all of the students replied that pre-reading comic strip did help their comprehension, especially on the understanding of the text content and the guessing of the unknown words.

Students' responses support the result of Q8 and Q9 in the Questionnaire. Pre-reading comic strips helped their guessing of unknown words and text comprehension.

Question Two. When asked “**When you read the text alone, did you refer to the**



comic strip in mind or just focus on verbal presentation ?” all of them responded that when they read, they referred to the comic strip all the time, not just focus on the words. They read the words, linked to the related comic strip, and then moved on reading.

“I didn’t concentrate on understanding the words, but referred to the pictures I just read all the time. It helps a lot!” (Pre3)

This response is consistent with the result of Q6 in the Questionnaire. Students in Pre-reading Group rated the highest on mental imagery when reading the text. Pre-reading comic strips helped students build mental model of the following text. So, when they read the text, they referred to what they read from comic strip in mind, thus had more mental imagery of the text.

Question Three. When asked **“When you recalled the text, was the main source of your memory from the text or from the comic strip?”** all of them answered that they recalled mainly from the comic strip. But they also recalled a little from the text if that part of the text content wasn’t shown in the comic strip. For example, the recall of ages, phone numbers, and the conversation in the text.

“I recalled both from the comic strip and the text, but more from the comic strip. If the information was not shown in the comic strip, I recalled it from the text. For example, he was 18 years old. He called his

father and 911.” (Pre1)

“I recalled mainly from the comic strip, only little from the text. I can remember the comic strip more than the text now.” (Pre5)

Students’ responses support the result of Q10 in the Questionnaire. Comic strips helped students’ memorization of the story. Students recalled the story more from the

comic strip than from the text.



Responses from During-reading Group

Question One. When asked “**Did during-reading comic strip help your comprehension of the text?**” all of the students replied positively that during-reading comic strip helped their comprehension of the text. They gained better understanding of the key words and long sentences through reading the comic strip.

“Yes, some sentences were too long for me to understand. However, by means of comic strip, I could understand what those meant.” (During3)

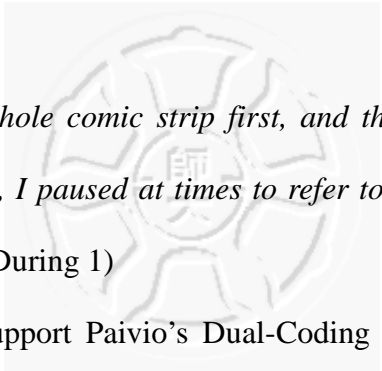
This supports students’ ratings of Q8 and Q9 in the Questionnaire and is congruent with Dual-Coding Theory. Reading the text with comic strip facilitates text comprehension because two codes are activated at the same time.

Question Two. When asked “**When you had the text and comic strip shown at the same time, did you read the comic strip first or the text first?**” three of them responded they read the comic strip first. They took an overall look of the comic strip first, and then compared the text with the pictures frame by frame.

Instead, two students started from reading the text. One of them read the text, and then compared with the comic strip frame by frame while the other read the whole text first, and then read the comic strip.

“I took a look at the comic strip first, and referred to the text frame by frame.” (During3)

“I read the text first, and stopped to refer to the first three pictures of comic strip. Then, I moved back to read the text. After finishing reading the whole text, I read the whole comic strip.” (During5)



“I read the whole comic strip first, and then started to read the text. While reading, I paused at times to refer to the pictures relevant to the text I read.” (During 1)

The findings above support Paivio’s Dual-Coding Theory. When students are given the text and comic strips at the same time, referential processing between two codes are activated automatically whether they read the text first or the comic strip first.

Question Three. When asked **“When you recalled the text, was the main source of your memory from the text or from the comic strip?”** three of the responses were that students recalled mainly from the comic strip. Students’ responses support the result of Q10 in the Questionnaire that comic strip helps memorization of the story.

However, two other students had different responses. They recalled more from the text. These two students explained the reasons that the context of the text was more complete than the comic strip. Only when they forgot the text content did they recall from the comic strip. One of them said that when he forgot the text, he would refer to the images in his mind. But those images were not of the comic strip he read, but the images with the figure of a real person and virtual reality he made in his mind. Their responses are transcribed as follows.

“I recalled mainly from the text because the information is more complete in the text. Only when I forget about the information in the text did I recall from the comic strip.” (During 1)

“I recalled more from the text. There were some images in my mind, but those images were not of comic strip. Those were my self-created images with mock persons and scenes.” (During 5)

Responses from Post-reading Group

Question One. When asked **“When you read the text, did any images relevant to the story automatically emerge in your mind?”** three of the students replied that as long as they understood the text, the images would emerge automatically. However, two of them responded that images seldom came out of their minds. They just tried hard to comprehend the text, and had few mental images about the accident part only.

“Yes, images relevant to the text content emerged as long as I understand that part of the content.”(Post5)

“I seldom had images emerging in my mind. I concentrated on reading the text and tried to understand the text.”(Post1)

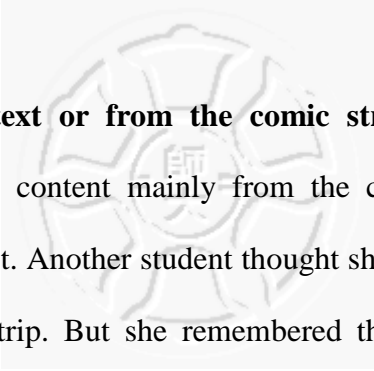
These responses are consistent with the result of Q6 in the Questionnaire. Students in Post-reading Group had significantly less mental imagery than those in Pre-reading and During-reading Groups.

Question Two. When asked **“Did post-reading comic strip help your comprehension of the text?”** all of the respondents had positive attitude toward the efficacy of the comic strip. Post-reading comic strip helped their understanding of the unknown words so that they could comprehend the whole story.

“Yes, I didn’t know the words seatbelt, and wire when I was reading the text. Until I read the comic strip later, I knew their meanings.”(Post5)

The responses support the results of Q8 and Q9 in the Questionnaire as in Pre-reading and During-reading Groups. Although the comic strip was read after the text, students still found it helpful to their comprehension of words and content.

Question Three. When asked **“When you recalled the text, was the main source of**



your memory from the text or from the comic strip?” three of the students answered they recalled the content mainly from the comic strip, and the details recalled mainly from the text. Another student thought she recalled half from the text, and half from the comic strip. But she remembered the comic strip more clearly because she read comic strip later than the text. The other student replied she recalled mostly from the text because she understood more from the text content. That was why she didn’t rely on the comic strip to recall the story.

“When I recalled, I mainly referred to the text. But I remember the comic strip more clearly than the text because the comic strip was presented the later.”(Post 3)

“I recalled mostly from the text. I understand much of the story content from the text, so I didn’t refer to comic strip.”(Post 5)

Most students in Post-reading Group held positive attitude toward the effect of comic strip on their memorization of the story. Only one student replied that she recalled mostly from the text because she understood the text more than the comic strip.

Summary of the Results

Results in this chapter include findings on students’ reading comprehension indicated by written recalls, text-based inferences and reader-based inferences gleaned from recalls, and their perceptions indicated by Questionnaires and presented in Interviews. Quantitative data, including the results of recall, text-based inferences, reader-based inferences, and Questionnaires, were analyzed with one-way ANOVA. Table 14 below summarizes significant differences among groups through quantitative analysis.

Table 14

Description of Significant Differences among Groups

| | Overall (four groups) | | | Sequencing (three groups) | | |
|-------------------------------------|--------------------------|---------------|--------------|------------------------------|---------------|--------------|
| | Con. | Con. | Con. | Pre. | Post. | Pre. |
| | vs. Pre. | vs. During | vs. Post. | vs. During | vs. During | vs. Post. |
| Recall | | Sig. | | | Sig. | |
| Text-based Inferences | Sig. | Sig. | Sig. | Sig. | Sig. | |
| Reader-based Inferences | Sig. | Sig. | Sig. | | | |
| Perceptions of Text Interest | Sig. | Sig. | Sig. | | | |
| Perceptions of Text Difficulty | | Sig. | | | | |
| Perceptions of Mental Imagery | Sig. | Sig. | | | Sig. | Sig. |

Note. 1. Control = Control Group; Pre = Pre-reading Group;

During = During-reading group; Post = Post-reading Group

2. Sig. = tests reaching a significant level ($p < .05$)

In Table 14, compared to Control group, the effects of comic strip on Experimental Groups are clearly shown. First, comic strips promote more recall when they are presented with the text simultaneously. Second, comic strips promote the generation of both text-based inferences and reader-based inferences no matter at which sequencing of presentation. Third, comic strips make the reading text more interesting whether students read them before, during, or after the text. Fourth, comic strips lower the difficulty of the text while during-reading the text. Lastly, pre-reading and during-reading comic strip promote more mental imagery when reading without

comic strip.

As for the effect of sequencing of comic strip presentation, the differences between During-reading and Post-reading Groups are noteworthy. First, During-reading Group promotes more recall and more mental imagery than Post-reading Group. However, Post-reading Group promotes more text-based inferences than During-reading Group.

Besides, the difference between During-reading and Pre-reading lies in the generation of text-based inferences only. Pre-reading Group generated more text-based inferences than During-reading. There is also only one difference between Pre-reading and Post-reading. That is, Pre-reading comic strip helps produce more mental imagery than Post-reading it when reading the text.

Overall, students' perceptions of the comic strip are positive. That is, all three Experimental Groups held positive attitudes toward the facilitating effects of comic strip on guessing of unknown words, text comprehension, memorization of the story, and speed of reading, although sequencing of comic strip presentation did not reach any significant level.

Lastly, from students' interview, the effect of comic strip on the comprehension of unknown words and text content is overall positive no matter in which temporal order of the comic strip presented. Besides, students in Experimental Groups recalled mainly from the comic strip, but also from the text if the information was not shown in the comic strip. As for referential processing, all students in Pre-reading Group referred back to the comic strip in mind all the time when they read the text while only some of the students in Post-reading Group had mental images of the text. As for students in During-reading Group, most of them would read the comic strip first and then made comparison with the text to comprehend the story.