The Effects of Self-Illustrating on Reading Comprehension in a Single-Subject Design

Vanessa Sitterberg
Martha Pelaez, Florida International University
The Effects of Self-Illustrating on Reading Comprehension in a Single-Subject Design

Vanessa Sitterberg and Martha Pelaez
Florida International University, USA

Abstract: With the use of an Alternating Treatment with no Baseline design, the effect of self-illustrating a reading passage on reading comprehension was examined. An Illustrating treatment and a Non-Illustrating treatment were used. Results show that the participant who enjoys artistic activities had improved reading comprehension accuracy during the illustrating treatment.

Sometimes regarded as merely a space filler, illustrations have been shown to actually improve reading comprehension (Moore & Skinner, 1985). In fact, texts often use pictures to help enhance their story, which then in turn helps with comprehending the text (Risko & Walker-Dalhouse, 2011). While pictures already printed with the stories have been shown to help with reading comprehension, benefits have also been found for self-illustrating pictures to go along with the stories (Paquette, Fello & Jalongo, 2007). Studies have found an improvement in reading comprehension when the students were asked to self-illustrate for the story they had just read (Elliot, 2007).

A study was done specifically to analyze the effects of illustrations attached to reading passage on eleven year old students’ reading comprehension (Moore & Skinner, 1985). The study involved both concrete and abstract passages. Two different phases were done for each type of passage: one with no illustration attached to the passage and another with an illustration attached to the passage. Moore and Skinner (1985) found that the abstract passages showed a significant improvement in reading comprehension, while the concrete passages did not have a significant improvement. Although one of the passage types did not show a significant improvement, this study shows that there is certainly an effect had by the inclusion of pictures with a reading passage; they stated, “Both text-based and script-based inferences were significantly enhanced when an illustration accompanied the abstract passage” (p. 45), demonstrating the benefits of pictures for reading comprehension.

Texts often include pictures to help facilitate the understanding of the information (Risko & Walker-Dalhouse, 2011). The picture should help with comprehending the main idea of the text it accompanies. “Hibbing and Rankin-Erickson (2003) demonstrated the importance of teaching students how to use illustrations and photographs to enhance their comprehension.” (as cited by Risko & Walker-Dalhouse, 2011, p376).

Several strategies have been used to demonstrate the importance of pictures on reading comprehension. The study by Paquette, Fello and Jalongo (2007) showed a more specific version of this idea in that they had their participants draw the illustrations to enhance their reading comprehension. The strategy was called “Talking Drawings” and the children would draw a picture of a topic before being told more information on it. This would show what the children already knew on this topic. Then, the child would listen to or read a story. Following the story, the child would enhance their previous drawing or start a new one (Paquette, Fello & Jalongo, 2007). The researchers state, “By evaluating the ‘before’ and ‘after’ artwork, educators can identify advances in students’ reading and listening comprehension of the terminology, facts, and principles on a particular topic” (Paquette, Fello & Jalongo, 2007, p. 65).
Another study was done which incorporated the students drawing their own illustrations for comprehension purposes. In this study by Leopold and Leutner (2012), the students were given science articles, prompted to self-illustrate, and then answered supplemental comprehension questions. The results demonstrated that drawing after reading the scientific article improved the comprehension of the article more so than instruction focused solely on the text (Leopold & Leutner, 2012). Leopold and Leutner (2012) said that “These results are consistent with the mental model approach to comprehension, showing advantages of drawing activity in fostering science text comprehension” (p.16). This shows that science text comprehension is facilitated by self-illustrations, but this method is not exclusive to science texts.

A study was designed and implemented by Elliot (2007) to improve reading comprehension with a drawing strategy. The researcher chose six articles, which were not science related. The researcher then created comprehension questions related to the article. The students were asked to read the article and summarize what they read by drawing a picture (Elliot, 2007). The students then completed the questions, and “Overall, scores increased by an average of 8% when students drew pictures” (Elliot, 2007, p. 25). This study demonstrated the benefit of self-illustrating for a passage which had just been read for reading comprehension.

As the Elliot (2007) study demonstrated, reading comprehension was improved by drawing the main idea of a passage. This idea was carried over into the present study, where two reading treatments in an Alternating Treatment with no Baseline Single-Subject Design were implemented. Participants were asked to read passages and draw pictures to summarize the main idea, followed by answering comprehension questions. Although that idea was carried over, the study by Elliot (2007) differed because it did not take into account the artistic abilities or interests of the subjects. The research seems to be in need of information regarding this topic. The study completed here involved one participant who expressed her joy for artistic activities, and another participant who expressed his dislike for artistic activities. The purpose of this study is to demonstrate the effects of self-illustrating on reading comprehension, taking into account the artistic interest or disinterest of the participants. It was hypothesized that the participant with artistic interests would have an improvement in reading comprehension after drawing a picture and the participant without artistic interests would not show an improvement after drawing a picture.

Method

Participants

This research included two participants. The first participant (participant 1) was a 12 year 1 month old girl. Participant 1 described herself as artistic; she expressed a love for drawing and painting. This was recorded in the functional assessment. The second participant (participant 2) was an 11 year 3 month old boy. The functional assessment showed he expressed a dislike for artistic activities; the opposite opinion of participant 1. Both participants are in a 6th grade general education classroom and do not receive any extra help for reading comprehension. The functional assessment (see Appendix A) revealed that both participants regularly perform reading comprehension in the school environment for class work and homework.

The study was done at each participants home. This was done in order to mimic the environment in which they each do their homework. The study method used could then potentially carry over into homework practices after the study has been completed.

Materials
The research study required the use of reading passages, paper, colored pencils, regular pencils, and reading comprehension questions. The reading passages were gathered from a workbook entitled 6th Grade Spectrum Reading. Each of the 18 passages was a page long, with two columns per page. No illustrations were included with the passages, only text was present on the page. During the Illustration Treatments, a blank sheet of white 8.5 x 11 paper was given to the participant. The box of twelve colored pencils was also provided here during these treatments. Each reading passage had an additional supplemental page with reading comprehension questions on it. Therefore, there were 18 pages of reading comprehension questions, each of them pertaining specifically to one of the reading passages. The page with the comprehension questions contained 8 questions which pertained to the story. Only text was present on this page; no pictures. Each session of the intervention included one Non-Illustrating treatment and one Illustrating treatment, each with one reading passage, one reading comprehension question set, and one pencil with eraser. The illustration treatment also included a blank sheet of paper and colored pencils. The Spectrum Reading workbook provided the answers to the reading comprehension questions. A timer was also used to record duration.

**Procedure**

An Alternating Treatment with no Baseline design was used for this study. This type of single subject design involved alternating between two treatments without gathering baseline information first. The first treatment (independent variable) was the Non-Illustrating treatment and the second treatment (independent variable) was the Illustrating treatment. Both participants performed each of these treatments in an alternating manner. During the Non-Illustrating treatment, the participant was instructed to “Think about the main idea of the story” during the 3 minutes given between reading the passage and answering the comprehension questions. During the Illustrating treatment, the participant was instructed to “Draw the main idea of the story” with the provided materials during the 3 minutes between reading the passage and answering the comprehension questions. Accuracy (the first dependent variable) was calculated using the Answer Key provided by the Spectrum Reading workbook to assess percent correct for each session. Duration (the second dependent variable) was also measured for each session; specifically, the amount of time the participant took to answer the page of reading comprehension questions was recorded. This was done with a timer.

The first step in the intervention is to implement the Non-Illustrating treatment. This begins the first session of the study. The participant sat at a table across from the researcher. The participant was given a reading passage, text side down on the table. The participant was instructed to turn it over, read the passage, and inform the researcher when they had finished. Then, the researcher stated, “Think about the main idea of the story you just read for the next 3 minutes.” These three minutes were timed with a timer. When the time was up, the participant was given the reading comprehension questions page, text side down on the table. The participant was instructed to turn the page over and answers the questions to the best of their ability. As the participant turned the page over, the researcher started the timer in order to record duration. When the participant was finished, the timer was stopped and the time was recorded. The researcher then checked the answers to the reading comprehension questions with the Answer Key and recorded the percent correct. This concluded the first half of one session, using the Non-Illustrating treatment.

Next, an Illustrating treatment was introduced. This was done during the second half of one session. For this treatment, the participant was given a new reading passage with the text side down on the table. The participant was once again instructed to turn it over, read it, and
inform the researcher when they had finished. Then, the researcher provided the participant with a blank sheet of paper and a box of colored pencils and instructed the participant to “Draw the main idea of the story you just read.” A timer was set for three minutes while the participant self-illustrated the story. When the time was up, the participant was given the reading comprehension questions page, text side down on the table. The participant was once again instructed to turn the page over and the researcher started the timer to record duration. When the participant finished, the timer was stopped and the time was recorded. Accuracy was also recorded using percent correct.

Further sessions would now be completed. The treatments continue to alternate until a total of 9 sessions (18 alternating treatments) have been implemented. The participant is allowed to keep the reading passage (and their drawing, if an Illustrating treatment) to help with the reading comprehension questions. They are allowed to erase and fix answers until they have stated they are finished. Then, no answers can be changed. The researcher is not allowed to answer questions about the passage content. An independent observer accompanied the researcher 30% of the time in order to calculate interobserver agreement. This was calculated by dividing the number of agreements by the sum of the agreements and disagreements and multiplying by 100. An interobserver agreement of 98% was calculated.

Results

The participants varied in their outcomes of this study. Participant 1 consistently scored higher in the Illustrating treatment than for the Non-Illustrating treatment, with the exception of one session (session 8). Her mean accuracy percentage for the Non-Illustrating treatment is 55.56 and her mean accuracy percentage for the Illustrating treatments is 75. This is nearly a 20% difference between the two treatments (see Figure 1).

Participant 2 did not show results for accuracy with a great difference between the two treatments. His mean accuracy percentage for the Non-Illustrating treatments is 41.67 and his mean accuracy percentage for the Illustrating treatments is 48.6. This difference is only about 7% and not as large as participant 1’s difference of about 20%. When viewing the results for participant 2 in Figure 1, the Illustrating treatments appear to yield higher accuracy percentages than the Non-Illustrating treatments for the first three sessions, but then the percentages for the rest of the sessions appear to be the same score for both treatments.

The duration of the participants responding to the reading comprehension questions did not yield any significant results for either participant (see Figure 2). Participant 1 has overlapping duration times for the first four sessions, and has longer duration times for the Non-Illustrating treatments than the Illustrating treatments for the remaining five sessions. Her mean duration time for Non-Illustrating treatments is 6:38 and her mean duration for the Illustrating treatments is 4:48. However, the Non-Illustrating treatments were not consistently at a higher duration than the Illustrating treatments.

Participant 2 has varying duration times for both treatments. The graph depicts clear overlapping of duration times for both treatments (see Appendix B). His mean duration times were 5:17 and 5:19 for Non-Illustrating treatments and Illustrating treatments respectively.

Discussion

This study evaluated the effectiveness of self-illustrating a reading passage on the comprehension of that passage. It confirmed the hypothesis that the participant who enjoyed artistic activities (participant 1) would show an improvement in reading comprehension for illustrating treatments, while the participant who does not enjoy artistic activities (participant 2) would not.
The results may have shown this outcome because a drawing task interested participant 1 more than it did participant 2. The participants were chosen for this study specifically because of their interest and disinterest in artistic activities. Because they are in the same age and grade, they could be compared based on their performances. The results suggest that the reason the study showed comprehension improvements for participant 1 was due to her interest in illustrating a short story. This could also explain the duration time for participant 1. Although the duration time differences cannot be considered significant, they can still be analyzed. The duration times were about equal for both treatments for the first few sessions, but then became longer for the Non-Illustrating treatments than the Illustrating treatments for the last five sessions. This could be attributed to participant 1’s interest waning for the passages she did not get to do an illustration for. Since she enjoyed the illustrations, she may have had more enjoyment for reading stories which she had the chance to illustrate for. She may have been visually imagining these stories as she read in order to put these ideas down on paper for the illustration portion. The story may have been more vivid in her memory for this reason, enabling her to respond to the questions in a quicker manner. As her interest seemed to wane for the Non-Illustrating passages, her memory of story details may have been lacking when she had to respond to the questions, thus taking more time to complete. This would be an interesting aspect to further collect research on.

The differences between the participants’ interests seem to have a clear correlation with their accuracy scores for reading comprehension. However, another difference needs to be addressed here that could be a limitation on this study; participant 1 is a girl and participant 2 is a boy. Not only is there a difference in artistic interest, but there is also a difference in gender. This appears to be a significant limitation, but other studies have shown that gender differences do not make a difference in the results of their studies on the effects of drawing on reading comprehension (Elliott, 2007). Taking this into account, it once again seems that the correlation here is between the comprehension scores and the participant’s interests, not their genders.

Gender differences for the effects of illustrating on reading comprehension have already been researched, but the field lacks information on this same topic taking the children’s interests into account. As every child tends to learn differently, their interests may play a role in their reading comprehension. Children who tend to enjoy artistic activities may benefit more from illustrations accompanying text than children who do not enjoy artistic activities. Replications of this study could be done to research whether these differences in interests consistently show differences in results. Further research can lengthen the study in order to see if duration times for artistic children would continue to differ for more sessions. Although this study may have had limitations, significant differences were found between the participants’ results to both treatments and this may be due to differing artistic interests. Therefore, this research can be used to launch new studies on relationships between interests and reading comprehension, as it confirmed that reading comprehension can be improved when self-illustrating is used in conjunction with artistic interest.

References


Figure 1: These graphs depict the accuracy scores in both treatments for each participant.
Figure 2: These graphs depict the duration times for answering the comprehension questions in both treatments for each participant.
Participant 1 and 2 yielded the same results.

**Functional Behavioral Assessment: Part 1 (Description)**

*Date*: 10-4-13  
*Student Name*: Participant 1, Participant 2  
*DOB*: September, 2001 and August, 2002  
*Data Sources*: Student Interviews  

**Description of Behavior (No. 1)**: Reading passages and answering comprehension questions  
**Setting(s) in which behavior occurs**: Classroom, home (for homework)  
**Frequency**: A few times a week, either in school or for homework.  
**Intensity (Consequences of problem behavior on student, peers, instructional environment)**: N/A  
**Duration**: Varies on assignment  
**Describe Previous Interventions**: None  
**Educational impact**: Improving reading comprehension

**Part 2 (Function)**

**Function of Behavior (No. 1)**: Specify hypothesized function for each area checked below.  
**Curriculum/Instruction**: The instruction in their classes for reading comprehension does not include self-illustrating.