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Text-Based vs. Graphic Novels: SSR Programs and their Effect on High School Students' Creativity Scores

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ABSTRACT

Creative thinking skills are among the chief abilities high school students need to find success in their studies, especially in humanities-based disciplines. A common avenue of exposure to such skills is through the written word, however, reading habits within high school students have been experiencing a downward trend. In this study, a mixed-method quasi-experimental research design was utilized to study the effects of a regular reading habit, stimulated using a Sustained Silent Reading (SSR) program, on high school students' creativity test scores. Over the course of six weeks, 17 high school students met for 17 15-minute SSR sessions; participants read either graphic novels or text-based novels. To gauge a change in creative thinking skills, participants were tested using modified versions of the Torrance Test of Creative Thinking (TTCT) before and after the SSR program. Score changes were then analyzed based on genres read and whether participants read graphic novels or text-based novels. On average, participants who participated in a text-based SSR program experienced a 7.611 score increase, while the graphic novel readers experienced minimal change. Furthermore, participants who read science fiction/dystopian and action/adventure material saw the greatest increase in TTCT scores. Though the sample size was relatively small, the results attested to the benefits regular reading habits—specifically using text-based reading material–can have on teenagers' thinking skills.

Introduction

According to a study performed through the American Psychological Association, 60% of 12th graders in the late 1970s reporting reading a book or magazine daily (2018). However, in 2016, that number decreased to merely 16%; researcher Jean Twenge and her team attributed this drastic decrease in reading habits to the emergence of digital media entertainment (American Psychological Society, 2019). Though the habit is diminishing amongst American youth, the benefits of reading have been lauded by many different scientific studies and personal testimonies. Benefits of reading for pleasure, especially within children and young adults, include writing, text comprehension, grammar, vocabulary, positive reading attitudes, and "greater self-confidence" (Clark & Rumbold, 2006, pg. 9). Often, the way reading is presented in early education can affect a reader's future habits into adulthood. Furthermore, researchers Christina Clark and Kate Rumbold posit that "reading amount and reading achievement are… related to each other" (2006, pg. 9). Thus, the action of getting into a habit of reading is crucial in the development of reading skills.

A program that arose in the 1970s, Uninterrupted Sustained Silent Reading (USSR) was proposed by Lyman Hunt from the University of Vermont to encourage students to read (Jensen and Jensen, 2002). Though similar programs go by other names, for the purposes of this study, it will be labeled as an SSR program. In SSR programs, teachers provide students with different reading materials, and each student may choose what they wish to read. Shorter and more frequent reading periods have proven more effective in SSR programs, for example, four times a week at 15-minute increments versus once a week for a one-hour increment (Garan &

DeVoogd, 2018, pg. 340). Optimistically, SSR programs must be long-term; educators Terry and Valerie Jensen suggest at minimum a 6month period (2002). Many similar educators see SSR as an optimal way to let students feel freedom over what they read while cultivating an enjoyment of reading for pleasure rather than only academic purposes.

Literature Review

Despite many educators' efforts, a deterrent to SSR-like programs was the findings of the 2000 Report of the National Reading Panel (NRP). After analyzing a multitude of studies on the subject, the panel "failed to find a positive relationship between reading encouragement and the amount of reading or reading achievement," declaring SSR programs invalid due to a lack of positive studies. (NRP, 2000, pg. 3). After this was released, public schools across the United States became wary of including SSR programs in their curriculum. However, in the last decade, many teachers and studies have arisen in opposition to the 2000 NRP report; experienced educators and researchers Elaine M. Garan and Dr. Glenn DeVoogd provided evidence that disproved the NRP Report's findings. Garan and DeVoogd suggest that the NRP's findings are inaccurate due to the purely experimental studies it examined, stating that "classrooms are not laboratories" (2018). Thus, the SSR program cannot be dismissed outright, but rather implemented and studied properly to bring about optimal success amongst participants.

One of the more niche examinations of reading benefits, specifically within fictional literature, falls within the realm of imagination and creativity. Dr. Antonia Peacocke, assistant philosophy professor at Stanford University, posits that imagination is constrained by one's phenomenal concepts, or a remembered experience one has, which are then limited by the phenomenology of one's past experiences. However, since literature expands one's phenomenal experience through different writing techniques, literature could thus expand phenomenal imagination, which is defined as experiencing things one has never known firsthand (Peacocke, 2020, pg. i). Furthermore, literature can trigger memories by using vivid language and details (more phenomenal properties) or how an experience can prompt feelings (Peacocke, 2020, pg. 10). Such details include authors' harmonization of the written word with imagination, for example, the phrase "velvety soft nose" uses perfectly chosen language to prompt the reader's experience with the softness of skin (Trasmundi & Cowley, 2020, pg. 10).

There were two notable studies which relate to the link between creative thinking and reading skills that I used as a model for my methodology. The first was conducted within students grades one through three in Natal, Brazil. The 75 students who participated took multiple tests to gauge their creativity through drawing as well as examine their information processing, phonological awareness, literary, and oral reading skills. The results of these examinations indicated a correlation between creativity, intelligence, and reading skills in all three classes studied, but most significantly in the grade three (ages 8-9) (Bezerra et al., 2022, pg. 6). In addition, the results acknowledged that the proper development of creativity is heavily dependent on teaching methods, highlighting the importance of a classroom environment that stimulates creativity (Bezerra et al., 2022, pg. 9). Though this example encompasses a younger age range than this paper is examining, it still demonstrates the effect reading habits and literacy skills have on an individual's creativity.

The second study, which examined 196 university students ages 18-21 in Taiwan, proposed that the essential elements to prepare a creative mind include knowledge, referring to the resources an individual being has, and behavior, referring to the habitual act of learning something new (Wang, 2012, pg. 7). This study examined the correlation of hours spent on reading and writing and scores on a creativity test. Each student completed a questionnaire on how many hours were spent on reading and writing per week and took the Abbreviated Torrance Test for Adults (ATTA) which measures how "creative thinking is the ability to sense problems, make guesses, generate new ideas, and communicate the results" (Wang, 2012, pg. 8). The results

showed positive correlation between creative ability and greater hours spent on activities like reading for pleasure, reading news, or completing writing assignments (Wang, 2012, pg. 11). Thus, it can be concluded that a combination of more frequent reading correlates with higher creative thinking skills.

Though this type of literature typically receives less credit, graphic novels can also have an significant impact on readers. For the purposes of this study, graphic novels will be defined as "images placed in sequence to tell a story," which includes comic books (Cook, 2014, pg. 23). In a more abstract definition, Dr. William BoermanCornell declares that both graphic novels and typical text-based novels function as "windows," "mirrors," and "sliding glass door[s]," referring to literature's ability to expose readers to new experiences (Boerman-Cornell et. al, 2017, pg. 1). As stated by Peacocke, the new experiences develop phenomenal concepts within each reader, thus expanding one's phenomenal imagination and allowing for greater growth within the individual's imagination. Francoise Mouley, art editor of *The New Yorker* and editorial director of TOON Books, a children's comic book publisher, comments further on the relevance of graphic novels and comics: "In a world where students are bombarded by thousands of pictures every day, why not embrace comics (or graphic novels), a printed medium that allows students to…read and re-read a treasure trove of visual information, the re-reading itself a process that will help them build a whole range of visual literacy skills" (Monnin, 2010, pg. xii). In the same book, *Teaching Graphic Novels: Practical Strategies for the Secondary ELA Classroom* by Dr. Kate Monnin, Associate Professor of Literacy at the University of North Florida, Mouley mentions in her forward Jim Davis, creator of the popular *Garfield the Cat* comic strip. Davis pointed out that when a person hears a word, for example, "table", they do not picture the letters "T-A-B-L-E," but rather, a visual image that "represents all the tables one has sat at, tables on which to eat, to draw, or even a table one once climbed into to dance" (Monnin, 2010, pg. xii). The patterns that are subconsciously uncovered when students' brains are confronted with both images and words combined place stories in an entirely new context as well as put new skills to the test, namely the critical-reading partnership. This partnership demands that three aspects of students: comparison and contrast, in which students compare the text and images in front of them; reference, in which students use background knowledge; and story-extension partnership, in which students identify the words, images, or the combination of words and images that progress the given story (Monnin, 2010, pg. 13). These skills correlate with the same mental functions that occur in certain creative processes that will be explained further in the Methodology section of this paper.

Gap in the Research

The gap explored in this study will aim to contradict the NRP's negative findings on SSR programs, particularly within high school students (grades 9-12). By being placed under the proper conditions for establishing a reading habit, students will be given the opportunities to gain the benefits detailed by Clark and Rumbold's paper. The proposed method of research consists of implementing an short-term SSR program before measuring the participants' creative thinking skills in the Torrance Test of Creative Thinking (TTCT), which is similar to the ATTA used in Wang's study but designed for adolescents. This paper's objective is to fill the both the gap that concerns how habitual reading encouraged by regular reading programs can increase creative thinking skills and the lack of research surrounding the different effects text-based novels and graphic novels have on students' creative thinking skills. Thus, the guiding question is as follows: through a mixed method, quasi-experimental study that implements a mock Sustained Silent Reading (SSR) program in a high school classroom, to what extent does habitual reading of text-based novels vs. graphic novels affect high school students' creative thinking skills?

Methodology

I chose to utilize a mixed method, quasi-experimental research design. A quasi-experimental research design "aim[s] to demonstrate causality between an intervention and an outcome" (Harris et al., 2006). I chose this research method because it most accurately aligned with my goal to present an intervention in the form of an SSR program to study the outcome: creative thinking skills. To test creative thinking skills, I enacted a pretest-posttest strategy with a modified Torrance Test for Creative Thinking (TTCT). The study is labeled as mixed methods as I am taking quantitative data through the TTCT test results as well as qualitative data from the analysis of participants' reading logs and genres of the books they read during the study.

Participant Selection

Participants were gathered on a volunteer basis via an interest survey that was posted on the school website and social media, and they were offered an incentive of service hours to participate. Participants were preferred to have little to no preexisting habit of reading, but this did not apply to all volunteers.

Twenty-one volunteers were gathered over a month-long period. Once that period ended, I randomly divided up the cohort into two groups (novels and graphic novels), ensuring there was an equal amount of gender and grade level per group. Three participants dropped out by the program's end, and one participant's test had to be eliminated as it was not completed within a logical timeline following the end of the SSR program. Therefore, I ended the study with 17 participants. I used numbers when referring to participants to maintain anonymity when analyzing their test results.

The Six-Week SSR Program

Both groups met for an average of 15 minutes a day for three days a week over the course of six weeks. In the six-week period, both groups underwent an SSR program to simulate a regular reading habit. In total, there were 17 SSR sessions, equating to an average of 255 session reading minutes per participant. Because some participants arrived early or late, the time elapsed per session ranged from 10-20 minutes.

Group 1 read text-based novels, which included all genres but could not be graphic novels, comics, magazines, news articles, or any required reading from school. Group 2 read graphic novels. Participants permitted to choose their own reading materials, provided they fit the requirements for each group. A common restriction for both groups was that reading materials could not be ones required for school and had to be hard copies (no eBooks). Participants were given the option to bring their own books or have one provided for them. For both groups, books had to be age appropriate (no picture books). Reading was done in a quiet classroom environment at which participants sat at desks and read silently.

Testing and Scoring the TTCT

To properly gauge a change in creative thinking skills, participants were tested using the Torrance Test of Creative Thinking (TTCT) before and after the six-week program. The pretest was administered two days before the start of the SSR program, and the posttest was administered one day after the end of the SSR program to maximize participants retention of material read. The TTCT has two parts: figural and written. The original TTCT had a figural and a verbal section, however, I opted to use the same verbal questions but have test takers write their answers as I wanted to observe written skills, not oral skills. Both groups took the same tests, and the pretest and posttest had similar but different questions, as included in Figure 1.

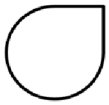
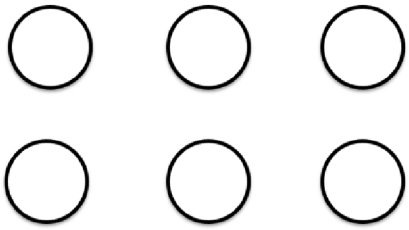
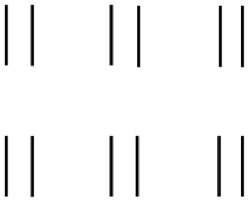
Test 1	Test 2
Q1 – 1. Examine the shape below closely.  Construct a picture by drawing additions onto this shape. The shape must be a central part of the picture, but you may add anything else you would like. Feel free to add a title or name to your illustration. (5 min)	**Q1 –** 1. Examine the shape below closely.  Construct a picture by drawing additions onto this shape. The shape must be a central part of the picture, but you may add anything else you would like. Feel free to add a title to your illustration. (5 min)
Q2 – 2. For each of the six identical shapes below, create six <u>different</u> objects or pictures by adding any drawings you wish. Feel free to add a title or name to each individual drawing. (5 min) 	**Q2 –** 2. For each of the six identical shapes below, create six <u>different</u> objects or pictures by adding any drawings you wish. Add a title or name to each individual drawing. (5 min) 
Q3 – Free draw: draw what you envision the world will look like in 100 years. Feel free to add a title or name to your illustration. (5 min)	**Q3 –** Free draw: draw an underwater scene. Feel free to add a title or name to your illustration. (5 min)
Q4 – Think about a toy car. What additions (or subtractions) could you make so that the car would be more enjoyable to play with? List your ideas below. (5 min)	**Q4 –** Think about an action figure. What additions (or subtractions) could you make so that the toy would be more enjoyable to play with? List your ideas below. (5 min)
Q5 – Imagine an empty plastic water bottle. What could it be used for? (Don't feel like you have to limit yourself to only practical uses). List your ideas below. (5 min)	**Q5 –** Imagine an empty cardboard box. What could it be used for? (Don't feel like you have to limit yourself to only practical uses). List your ideas below. (5 min)
Q6 – How many words can you use to describe a <u>mountain</u>. List all words below. (5 min)	**Q6 –** How many words can you use to describe a <u>dog</u>. List all words below. (5 min)
Q7 – Imagine you were invisible for a day. What problems might you face? What benefits might you experience? (5 min)	**Q7 –** Imagine you had the ability to teleport. What problems might you face? What benefits might you experience? (5 min)

Figure 1.

I graded the tests partially based on E. Paul Torrance's Torrance Tests for Creative Thinking Interpretive Manual, while editing it to fit the format that worked the best for this study. In the figural section of the TTCT, I chose to examine three sub-constructs of creativity: fluency, elaboration, and originality (Alabbasi et al. 2022). Furthermore, I utilized three of the thirteen criterion-referenced measures added to the TTCT Figural section in 1984. Each sub-construct and measure is described in Figure 2.

Creative Measures	**Description**	**Questions that Contain this Measure**
Fluency	Correct interpretation of prompt	Q1, Q2, Q3
Elaboration	Number of details outside minimum stimulus	Q1, Q3
Originality	Infrequency and unusualness of response	Q1, Q2
Emotional Expressiveness	i.e. a smile or frown on a character's face	Q1, Q2, Q3
Storytelling	Clear example of a story/event taking place	Q1, Q2, Q3
Movement/Action	i.e. waves in motion or a character running	Q1, Q2, Q3
Fantasy	Incorporation of fictional elements	Q1, Q2, Q3
Use of Titles/Words	Organizing processes of thinking to label a figure	Q1, Q2, Q3
Variance	Uniqueness of each of the 6 shapes	Q2
Additions	Additions outside of given shape	Q2

Figure 2.

Responses were scored based not on drawing ability but examined the creative elements that each response contained. Both the categories and the maximum point values for each are included in Figure 3. The Figural Section was scored out of 76 points, and graded examples are included in Appendix G-I.

Q1 - Adding to One Shape **15 points**	**Q2 - Variations on Six Shapes** **8 points per shape; 48 points total**	**Q3 - Drawing from Prompt** **13 points**

Fluency – if student did not achieve, did not get scored on following categories	Fluency – if student did not achieve, did not get scored on following categories	Fluency – if student did not achieve, did not get scored on following categories.
Elaboration – 1-5 occurrences = 1 pt. 6-12 occurrences = 2 pts. 12+ occurrences = 3 pts.	Additions – 0.5 pt.	Elaboration – 1-5 occurrences = 1 pt. 6-12 occurrences = 2 pts. 12+ occurrences = 3 pts.
Originality – 2 pt.	Originality – 1 pt.	Storytelling – 2 pt.
Storytelling – 2 pt.	Storytelling – 1 pt.	Movement/action – 2 pt.
Movement/action – 2 pt.	Movement/action – 1 pt.	Emotional Expressiveness – 2 pt.
Emotional Expressiveness – 2 pt.	Emotional Expressiveness – 1 pt.	Titles/words– 1 pt. if title or words 2 pt. if title and words
Titles/words – 1 pt. if title or words 2 pt. if title and words	Titles/words – 0.5 pt. if title or words 1 pt. if title and words	Fantasy – 2 pt.
Fantasy – 2 pt.	Fantasy – 1 pt.	
	Variance – 1 pt. (awarded if each shape is different)	

Figure 3.

The verbal section of the TTCT included four questions that highlighted different themes, as described in.figure 4.

Creative Measures	**Description**	**Questions that Contained this Measure**
Fluency	Number of responses	Q4, Q5, Q6, Q7
Imaginative/Originality	Suggestions that do not already exist for the given product, i.e. wings on a car	Q4, Q6, Q7
Fantasy	Incorporation of fictional elements	Q4

Elaboration	Number of responses that contained further explanation, i.e. "a musical instrument used for annoying people" vs. "an instrument"	Q5, Q7

Figure 4.

Responses for the written portion were scored as percentages, for example, the percentage of original responses out of the total number of responses. Both the categories and the maximum point values for each are included in Figure 5. The total points available in the Written Section is 50, and graded examples are included in Appendices J-L.

Q4 – Product **15 points**	**Q5 – Random Object** **10 points**	**Q6 – Descriptive Words** **10 points**	**Q7 – Unusual Situation** **15 points**
Fluency – amount of responses	Fluency – amount of responses	Fluency – amount of responses	Fluency – amount of responses
Originality – 1 pt. for every 10% of responses that show originality (up to 10 pt.)	Elaboration – 1 pt. for every 10% of responses that are elaborated upon (up to 10 pt.)	Originality – 1 pt. for every 10% of responses that show originality (up to 10 pt.)	Elaboration – 1 pt. for every 10% of responses that are elaborated upon (up to 10 pt.)
Fantasy – 1 pt. for every 20% of responses that show fantasy (up to 5 pt.)			Originality – 1 pt. for every 20% of responses that show originality (up to 5 pt.)

Figure 5.

Analysis of TTCT Scores

Because I intended to study the change in creativity and not creativity by itself, I focused on the score changes rather than what the scores were. For each group, I calculated the average score changes for the total test, for the figural and written sections, and for each individual element in the figural and written sections (i.e. fantasy or originality). I then used these averages in my analysis with other qualitative and quantitative elements, such as the reading logs, number of pages read, and genres read.

Reading Logs and their Analysis with the TTCT

Participants kept reading logs (Appendix F) to record each session, the book they read, how many pages were read, and any outside reading they completed. Participants who could not attend a session were instructed to make up the reading on their own and document the make-up session on their reading log. Scores were linked to each participant's number of pages read. I observed if commonalities existed between number of pages read and significant TTCT increases and/or decreases. *Surveys and their Analysis with the TTCT*

Before and after testing and the SSR program, participants filled out surveys so I could gain an understanding of their past reading habits and preferences. The questions for the preliminary survey are included in Figure 6:

Question	**Answer Options**
How many hours do you spend reading a week FOR SCHOOL?	None Less than 1 hour 1-2 hours 2-4 hours 4+ hours
How many hours do you spend reading FOR PLEASURE a week? (This only includes reading in your free time, separate from any schoolwork)	None Less than 1 hour 1-2 hours 2-4 hours 4+ hours
One a scale of 1-5, how would you rate reading in terms of a leisure activity?	1 – I strongly dislike reading for fun 5 – Reading for fun is my favorite activity
On a scale of 1-5, how would you describe your reading speed?	1 – Very slow 5 – Very fast
On a scale of 1-5, how would you rate your skills in writing?	1 – Not well 5 – Excellent
On a scale of 1-5, how would you rate your skills in literary comprehension (reading something and being able to answer questions about it)?	1 – Not well 5 – Excellent
Do you usually read prose-based books (regular novels) or picture-based books (graphic novels/comic books/manga)?	Novels Graphic novels Neither
On a scale of 1-5, how creative would you consider yourself?	1 – Not creative at all 5 – Very creative
What is your favorite subject?	English, social studies/history, math, science, theology, world language, art, music, physical education, and other (with an option to record another class)

Figure 6.

In the post-study survey, administered after each participant took the final test, participants recorded the following information as seen in Figure 7:

Question	**Answer Options**
Did you read fiction or nonfiction?	Fiction (imaginary events) Nonfiction (true events) Both

What genre(s) did you read?	History, romance, mystery, contemporary, biography, science fiction/dystopian, fantasy, horror, action/adventure, thriller, classics, and other (with an option to record another genre)
Did you continue reading these books outside of the mandated reading sessions (i.e. on your free time during weekends or after school)?	Yes/No
On a scale of 1-5, how much did you enjoy participating in the SSR program?	1 – I strongly disliked it 5 – I loved it
On a scale of 1-5, do you think participating in the SSR program increased your interest in reading in your free time for fun?	1 – I will not read in my free time at all unless required to by school 5 – I can see reading becoming one of my favorite hobbies
On a scale of 1-5, do you see yourself as more creative after participating in SSR than before?	1 – I see no change in my creativity or creative thinking skills 5 – I have seen a great change in my creativity and I have developed numerous creative thinking skills
Do you have any final thoughts on participating the study?	Open answer

Figure 7.

Like the analysis of the participants' reading logs, commonalties between genres read were observed alongside the increase or decrease in TTCT scores. I did not utilize the other questions as I found them to be irrelevant to my study; I narrowed my focus to purely reading, amount read, genres read, and change in creativity. I acknowledge that all my participants have different reading and writing abilities, and though further research may confirm Bezerra's study that greater reading comprehension/general reading skills have an impact on creativity, I chose not to explore that.

Confidence Interval

I calculated a confidence interval using a one-sample t interval for a population mean, where x was the mean of the TTCT score changes of the given section, t* was the critical value for the t distribution (95% confidence), s_x was the standard deviation of the data set, and n is number of participants in the given group minus one degrees of freedom. The equation I used is included below:

$$\overline{x} \pm t^* \frac{s_x}{\sqrt{n}}$$

Ethical Implications

Because this study involved human participants, multiple steps were taken to ensure participants were treated in an ethical manner. The research method, both tests, and all surveys were approved by an Institutional Review

Board registered with the National Institute of Health before data collection began. Participants were notified that they could opt out of the study at any time.

I screened all books I provided for the participants for explicit content. While many genres were provided,
both the regular novels and graphic novels were restricted to books that did not contain exceedingly graphic content (i.e. excessive gore or violence) or explicitly sexual content. Participants were notified that some of the books contained mature content (i.e. mature themes such as violence, mild sexual content [i.e. kissing], suicide, etc.).

Hypothesis

I hypothesize that the test scores will align with the positive correlation between greater amount of reading/exposure to literary elements and creative thinking skills, shown in Bezerra's and Wang's studies. Wang's study showed that individuals who spend more time reading score higher in creativity tests; as such, individuals who participate in a program in which great amounts of reading are induced would logically also experience the same results. Within the sections of the TTCT itself, I hypothesize that Group 1 (text) will score higher in the Written Section, due to the expansion of phenomenal concepts as experienced through the written word (Peacocke, 2020, pg. 2). Alternatively, I hypothesize that participants in Group 2 (graphic novels) group will score higher in the Figural Section due to the mental functions graphic novels stimulate with the combination of words and images (Monnin, 2010, pg. 13.)

My hypotheses surrounding the correlation of genres/amount read with a change in creativity are as follows: due to the greater intake of phenomenal concepts that accompanies greater page amounts read, I believe that those who read more books during the 6-week period will show a greater overall increase in their TTCT score.

Furthermore, I hypothesize that participants' who read fictional books will show an increase in the Fantasy and Originality sections of both the Figural and Written Sections of the TTCT because of their greater exposure to fictional elements.

Analysis

After the completion of the six-week SSR program and the subsequent testing of participants, I analyzed the resulting changes in TTCT scores. Any point change less than 1 was considered negligible compared to the 126 total points of the test.

Overall Score Changes

Portions	*Group 1*	*Group 2*	*Combined*
Figural	5.389	-0.688	2.351
Written	2.222	1.25	1.736
Overall	7.611	0.563	4.074

Figure 8.

As seen in Figure 8, Group 1 experienced the predicted increase of overall points, with a total score of 7.611 points on average. However, Group 2 experienced an average increase of 0.563 points, which I have determined to be negligible. Within the individual sections of the TTCT, Group 1 surpassed Group 2 in both the written and figural sections, though especially in the figural section, which differed greatly than my original hypothesis that Group 2 would perform better in the figural section.

Individual Participants' Scores and Score Changes

Group 1 - Numbers	*Test 1*	*Test 2*	*Figural Change*	*Written Change*	***Total Change***
1	26	41.5	0.5	15	**15.5**
2	52	51	10	-11	**-1**
3	30.5	42.5	8	4	**12**
4	51.5	61.5	9	1	**10**
5	28.5	46.5	20	-2	**18**
6	21.5	18.5	-3	0	**-3**
7	32	41.5	9.5	0	**9.5**
8	51	57.5	-3.5	10	**6.5**
9	51.5	52.5	-2	3	**1**

Figure 9.

Group 2 - Numbers	*Test 1*	*Test 2*	*Figural Change*	*Written Change*	***Total Change***
10	41	56	13	2	**15**
11	46.5	43	-3.5	0	**-3.5**
12	54	53.5	2.5	-3	**-0.5**
13	30	39	1	8	**9**
14	73.5	64	-10.5	1	**-9.5**
15	61.5	42.5	-11	-8	**-19**
16	43.5	44	-1.5	2	**0.5**
17	36	48.5	-4.5	8	**12.5**

Figure 10.

Included in Figures 9 and 10 is the breakdown of each individual participant, their pre-and posttest scores, the changes within the figural and written sections, and their total score change. As previously stated, Group 1 experienced a larger increase, which is reflected through each of their individual scores. The greatest decrease a Group 1 participant experienced was only 3 points (Participant 6). In contrast, Group 2's results were less consistent; though there existed multiple outliers in both groups, most were in found in Group 2. For example, Participant 10 showed the greatest increase with 15 points, whereas Participant 15 decreased 19 points. Because of the existence of multiple outliers in an already-small sample size, it must be noted that this may not be as

accurate a representation of the general high school population as I had hoped. I would advise further research to utilize a larger sample size so outliers may be better understood.

Elements within Figural Section

Figural Element	*Group 1*	*Group 2*	*Combined*
Originality	1.444	1.75	1.597
Fantasy	0.333	0.5	0.417
Storytelling	0.444	-0.875	-0.216
Emotional Expressiveness	-0.333	-2.25	-1.292
Movement/Action	1.778	0.875	1.327
Words/Title	-0.111	-0.816	-0.464

Figure 11.

Each figural element and its respective score change is recorded in Figure 11. Though many elements had minimal change, Originality saw the most significant increase with 1.597 across both groups. Group 2 did experience a slightly larger increase than Group 1, but the 0.306-point difference is negligible. Group 1 experienced a similar increase in Movement/Action with an increase of 1.778 points. The most notable decrease was Group 2's Emotional Expressiveness category, with a decrease of 2.25 points.

Elements within Written Section

Written Element	*Group 1*	*Group 2*	*Combined*
Imaginative	3.111	2.25	2.681
Elaboration	-0.889	-0.75	-0.82
Fantasy	0	-0.25	-0.125

Figure 12.

Similarly, each written element and its respective score change is recorded in Figure 12. Both groups experienced a significant increase in Imaginative responses, with Group 1 continuing the trend of demonstrating a slightly higher increase. However, the last two sections, Elaboration and Fantasy, both saw minimal changes across both groups.

Genres Read

Genre	*Group 1*	*Group 2*	*Combined*
Action/Adventure	10.4	1.147	5.909
Biography	-1	N/A	N/A
Classics	N/A	-7.75	N/A
Contemporary Fiction	9.75	-5	2.375
Fantasy	8.5	-0.167	4.167
History	-1	-14.25	-7.625
Horror	-3	-3.5	-3.25
Mystery	8	-11.25	-1.625
Romance	4	-0.25	1.875
Science Fiction/Dystop	11.5	0.75	6.125
Thriller	6.5	-11.25	-2.375

Figure 13.

My hypothesis predicted fictional readers to show a greater increase in creativity scores. However, only two participants read nonfiction, so I was unable to test this section of my hypothesis, therefore I examined individual genres. Figure 13 records each genre read by both groups and the score change experienced by those who read such genres. The three most common genres read were Action/Adventure, Romance, and Science Fiction/Dystopian, and I will be primarily examining them since those categories have the most accurate average scores. Science Fiction/Dystopian saw the largest increase in overall points, with a significant increase of 11.5 points in Group 1. Participants who read Action/Adventure material also experienced a significant increase, with an increase of 10.4 points in Group 1 and the highest increase in Group 2 with 1.147 points. However, Romance saw a slight overall increase, with Group 2's change significantly smaller than Action/Adventure and Science Fiction/Dystopian, and Group 2's change negligible. The combined change, a decrease of 0.75 points, was considered negligible. Further research might want to consider engaging with participants who read a larger variety so other genres may be analyzed.

Pages Read

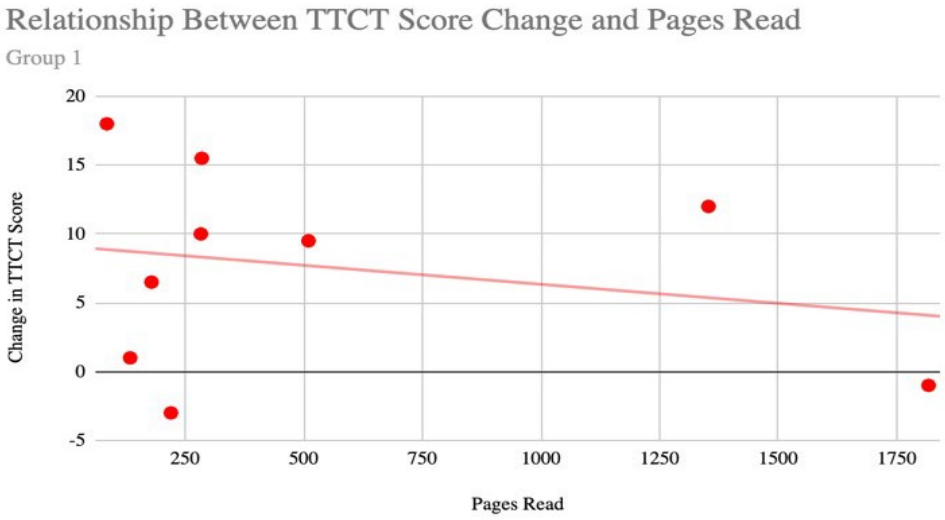


Figure 14.

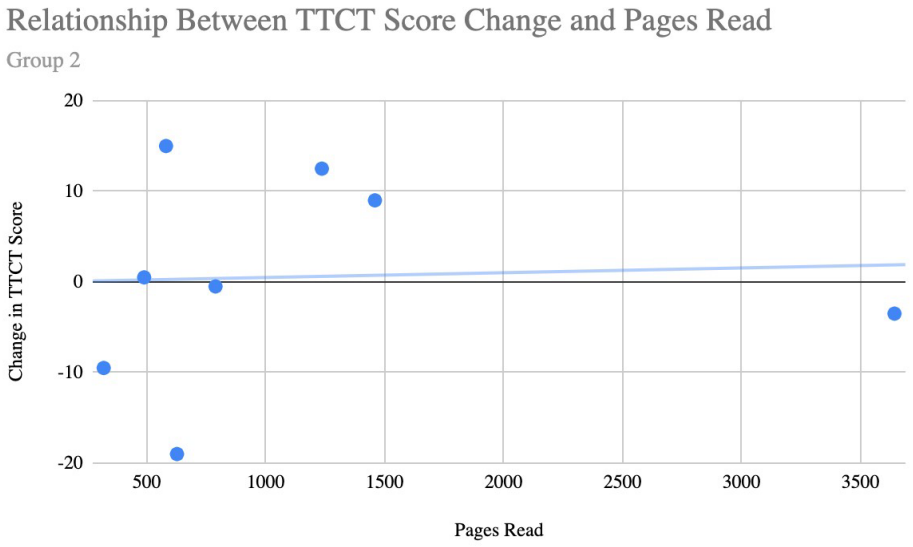


Figure 14.

After graphing the relationship between number of pages read and TTCT score change, there is no correlation. This may be due to the existence of multiple outliers. According to my hypothesis, however, the line of best fit should have been a linear increase; more pages read, meaning more literary experiences uncovered, should have led to a greater change. However, this is not the case; Group 2's relationship (Figure 14) stays relatively constant while Group 1 (Figure 13) shows a small decrease.

Limitations

The main limitation this study encountered was the gender disparity between participants as well as my sample size. 15 of my 17 volunteer participants were female. Due to the gender imbalance as well as the small sample size, my results may be inaccurate when applied to the wider high school population. If I were to replicate this study, I would not only choose a larger cohort, but a cohort with more of a gender balance to get more accurate results across ages and genders. Furthermore, I initially intended to study 5% of my school's population (64 students) however, I only gathered 17 volunteers. This small size proved difficult when there arose multiple outliers that heavily affected the score averages and standard deviations. Therefore, to gain an accurate view of the general high school population, a larger cohort is recommended.

Secondly, creativity can be a subjective topic. There are no right or wrong answers on the TTCT; the participants received zeros only on questions their answers did not fit the prompt. Therefore, I approached the scoring of the tests as objectively as possible. In professional settings, the TTCT is scored by a qualified school psychologist who has been provided with training and scoring manuals. Due to time constraints and lack of resources, I was not able to obtain such training and instead chose to create my own rubric loosely based off the original TTCT scoring guidelines (detailed in the methods section). Because of this, scores from my personalized TTCT would differ from a real TTCT. However, this allowed me to choose specific parts of the TTCT rubric to focus on (i.e. originality, elaboration, adherence to shapes in figural answers, etc.) and allowed for my results to be more nuanced.

Discussion

No Change in Group 2's Scores

The result that differed most from my original hypothesis was the minimal change in Group 2's TTCT scores; I had originally predicted an increase, specifically in the figural section. I attribute the minimal change in Group 2's TTCT scores to the idea that in textual readings, a reader must imagine scenarios when only given written descriptions. In graphic novels, all visible descriptions are available to the reader, and while they must still connect words with the pictures, they may use certain creative processes less. Text-based novels stimulate a multitude of artificial senses with the use of imagery, including sight, sound, smell, touch, and taste. However, graphic novels' visuals stimulate the artificial sense of sight only. The gained phenomenology Peacocke discussed differed more than I hypothesized between graphic novels and text-based novels. Based off the TTCT scores, it can be concluded that overall, the text-based novels expand readers' phenomenology further, therefore resulting in a greater increase of creativity.

Lack of Correlation Between Pages Read and Score Changes

My original hypothesis theorized that a greater page amount read would result in greater exposure to new phenomenal experiences, thus increasing creativity scores in readers. However, there was no correlation. For example, Participant 11 read 3,643 pages and yet experienced a score decrease of 3.5 points, while Participant 17 read 1,236 pages and experienced an increase of 3.5 points. I attribute this to the disparity of word counts per page across graphic novels and text-based novels. Graphic novels tend to contain more visuals on each page as opposed to words, allowing readers to generally consume graphic novel content faster. Group 2 tended to read more pages; Group 1 read an average of 540.667 pages per participant while Group 2 read an average of 1,142.875 pages per participant. Even amongst text-based novels, the amount and difficulty of words presented on a page is varied. With the disparity of difficulty levels and number of words per page, reading speeds across both groups are incomparable, rendering this section of my hypothesis inaccurate.

Genres and Score Changes

Out of the three observable genres–Romance, Science Fiction/Dystopian, and Action/Adventure–the genres that saw the most increase in scores were Science Fiction/Dystopian and Action/Adventure. However, these increases were primarily seen in Group 1. I posit that Science Fiction and Action/Adventure saw the most increase due to their inclusion of specific elements such as fantasy, movement/action, and extensive world building and storytelling. As a result, participants were exposed to such elements, heightening their creativity skills in those specific sections. Furthermore, the increased scores within the Action/Adventure readers may allude to the increase in movement action elements in Group 1's figural answers. Thus, Group 1's increased exposure to the written phenomenology regarding situations that reflected movement and/or action (i.e. fight scenes, characters exercising, etc.) would result in their figural answers containing those elements. The question again arises, why did Group 2 not see such a drastic increase? We must refer to the overall lack of change in Group 2's scores; their creativity and imaginative skills were less challenged by the written word and made more accessible through clear visuals. One specific genre I would have liked to observe more was Fantasy; however, not enough participants read Fantasy novels to constitute an accurate average. However, I would predict there would be a correlation between number of participants who read fantasy-themed novels and their resulting Fantasy score increases, similar to the relationship between the amount of Action/Adventure read and the Movement/Action increases. *Confidence Interval*

Group 1	*Group 2*
[1.631, 13.591]	[-9.705, 10.831]

Figure 15.

The intervals above reflect that I am 95% confident that students from similar backgrounds who completed the same 6-week SSR program reading either text-based or graphic novels would experience the score changes within either interval, depending on what they read. As seen above, the interval for Group 1 is more precise and predicts a more positive score change for other students who would undergo a text-based SSR-program. However, Group 2's interval is much broader, largely because Group 2 included more outliers that resulted in a higher standard deviation, leading to a greater possibility of a score decrease should other students undergo a graphic novel-based SSR program. The small sample size and resulting outliers caused a slight skew of my confidence interval. Because of my quasi-experimental design which includes humans with little control variables, there are multiple elements that may have contributed to the number of outliers that emerged. However, for this study, Group 1 showed a more favorable interval with a 95% guaranteed increase in creativity points, therefore demonstrating the validity of a textbased SSR program.

Aligning with and Adding to Current Research

According to the 2000 NRP report, programs like SSR did not prove to be beneficial to youth. However, in this study, both the predicted results from Bezerra and Wang's studies on the relationship between reading skills/habits and creativity and the Clark and Rumbold's reported impacts of SSR programs were utilized to prove the impact of SSR programs on creativity. The results of this study, at least for the text-based novel readers, did align with Bezerra and Wang's results in that greater reading habits did increase creativity scores.

This study offered an insight into SSR programs at the high school level and a unique lens to the current body of knowledge surrounding SSR programs: the difference between types of books read, specifically text-based vs. graphic novels. This study was more successful in exploring the impact of text-based reading habits as opposed to graphic novel reading habits, however, this allows opportunities for further research that may aim to delve deeper into the impacts habitual reading graphic novels have apart from creativity. This study aimed to add to the studies and educator testimonies that opposed the NRP's negative findings on SSR programs, and it has supported such accounts by demonstrating the impact text-based SSR programs have on students' creativity.

Conclusion

This study resulted in more new findings than accuracy to my original predictions. Most notably, Group 2 had mimical change in scores. I attribute this to the less amount of creative thinking skills needed when reading the graphic novels whereas in text-based novels, the reader must imagine the written situations. Aligning with this trend, Group 1 showed a greater increase in the figural section while Group 2 experienced a decrease, which was opposite of my hypothesis. While my original hypothesis included the different between participants who read fiction and nonfiction material, I had to edit this section as only one participant read fiction. Instead, I

examined certain genres, and found that participants who read Science Fiction/Dystopian and Action/Adventure material saw the greatest increase in creativity, particularly in Group 1. Furthermore, unlike my prediction, there was no correlation between the number of words read and score change, as every participant reads at different levels and speeds. However, my hypothesis proved accurate for Group 1's overall change in scores as they increased 7.611 points overall, proving the impact of a text-based SSR program on creativity.

One final piece of evidence speaks to the significance of SSR programs: when asked to rank their enjoyment of the program on a scale of 1 to 5, participants answered an average of 4.11, and no one answered less than a 3. Even though this does not focus solely on creativity, it speaks to the core objectives of the SSR Program: to instill reading habit and a love of literature. Though a larger sample size may be required to solidify the benefits of the program on creative thinking skills, it can be concluded that an SSR-like program can be beneficial to high school students, specifically using text-based reading material. Along with the other clear benefits that reading habits provide, students will also experience growth in their creative thinking skills, which have been proven to serve people well in whatever career or future they pursue. Thus, an SSR program can be the core building blocks of a love of literature and thinking skills.

Further Research

Creativity is a very broad subject; if I were to replicate this study, I would focus on a few specific elements of creativity. The Fantasy element of creativity, both in the written and figural sections, was an element that I would have liked to experiment with further. Because of fantasy's vast inclusion of fictional elements, such as worldbuilding, movement/action, storytelling, complex character arcs, and other character and/or world features not seen in nonfiction novels, fantasy novels may have an especially interesting impact on expanding one's phenomenology. Furthermore, the results of this study prompt a deeper look into graphic novels and their benefits. Cook's study establishes that graphic novels do indeed benefit readers, however, the benefits to creativity were not shown in this study. More extensive research on graphic novel habits may be beneficial to truly understand in what ways graphic novels can help students take in information in a new way, building certain skills like imagination or creative thinking skills.

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