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Using Graphic Novels to Improve Reading Comprehension in Students with Autism Spectrum Disorder

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Using Graphic Novels to Improve Reading Comprehension in Students with Autism Spectrum

Disorder

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A thesis

presented to

the faculty of the Department of Special Education

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Education in Special Education

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by

Rachel Denney

May 2024

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Pamela Mims, PhD, Chair

John Wheeler, PhD

Dawn Rowe, PhD

Keywords: Graphic Novels, Autism, Reading Comprehension

ABSTRACT

Using Graphic Novels to Improve Reading Comprehension in Students with Autism Spectrum

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by

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Upper elementary and middle school students can be less than engaged due to the lack of

pictures in texts. Making the reading transition from picture books to complex text literature is

challenging for students. Graphic novels could be a resource to improve student engagement and

comprehension and support students in that transition. Students with ASD can face additional

challenges with reading comprehension and instruction during school. Currently graphic novels

are not used commonly for students and the goal of the research is to investigate if these types of

books can be a support for students, reading comprehension and engagement. The purpose of this

study was to investigate the impact of graphic novels and system of least prompts on reading

comprehension of middle school students with autism spectrum disorder. The study implemented

a single case multiple probe design with four participants, conducted in a private date school.

Results will be shared along with limitations and implications for future research and practice.

DEDICATION

This thesis is dedicated to my mother, who knew for years I would be an educator even when I didn't listen to her. She is the drive and force behind my love for special education. She leads by example with my sister and I proudly follow her footsteps.

ACKNOWLEDGEMENTS

I have the honor to acknowledge multiple people who have supported me through this journey. First, I want to thank my committee: Dr. John Wheeler, Dr. Dawn Rowe, and Dr. Pamela Mims. Each one of you were powerful leaders in my program of study and pushed me as a student and helped reach that level of expectation. Your diligence in my education left an impact on me, and transfers to the schools I work in to support students. Dr. Mims I want to acknowledge you specifically for your support in my vision for this study. Your enthusiasm for research is what I needed to take my vision and make it reality. Thank you for challenging me as a student, and truly pushing me to see this through.

Next, I want to thank my family for supporting me through this. With the coordinated efforts from my husband, parents, and sweet children I continued to work hard to finish. My husband cheered me on when I needed it most and kept my passion for this field going. My parents were role models for me as advocates in special education and gave me the fire to fight for my students. I am lucky to have them as a support network and role models in my life.

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Chapter 1. Introduction

Reading comprehension is a critical foundational skill in a student's time in school. Although this is a foundational skill many students struggle to be effective readers and understand what they are reading (Hairston 2011). Students who are identified to have autism spectrum disorder (ASD) can have an even harder time with reading comprehension (Nation et al. 2006). In fact, as many as 65% students with ASD are reported to struggle with reading comprehension (Randi et al. 2010). Given this concern, teachers need effective intervention to address reading comprehension.

Historically little guidance has been given to effective strategies for teaching comprehension to students with ASD, but given more recent legal mandates (e.g., NCLB; IDEA 2004 reauthorization) more studies have been conducted to identify effective strategies. In 2015 Knight and Sartini conducted a comprehensive review that identified evidence-based practices to teach reading comprehension to students with ASD, including visual supports, prompting systems, and model-lead-teach. While this critical review of literature was helpful, most of the studies reviewed focused on younger children.

While there have been several identified evidence-based interventions to support the reading comprehension of students with ASD additional research is needed to focus on effective practices for teaching reading comprehension to middle school age students with ASD.

A more recent intervention that has shown promise is the use of graphic novels to support reading comprehension. Graphic novels (GN) are an excellent tool for students that can provide grade appropriate reading but with engaging graphics to help students synthesize information. Use of GN can be particularly helpful for students who might struggle to understand or comprehend information such as students with Austin Spectrum Disorder (ASD) (Cohn 2018).

Given the rise in use of GNs, the goal of this research is to investigate the use of GNs to increase reading comprehension.

For example, a study by Brennan (2013) on how graphic novels support reading comprehension development was conducted in a 4th grade classroom with 21 students. The study used a three reading groups based on ability and surveyed the students before, during, and after the study to assess the student's perspective of the GNs and the strategies used for regular literature and for GN literature. The results show that students felt excited about reading and were engaged with the text. The study indicated that the use of GN improved students reading strategies and supported literacy skills developed by visual literacy. Although this study was successful it was not focused on the impact for students with disabilities or ASD. Research is needed to see if GN can be a viable strategy for students with disabilities and research is needed to show that GN can promote reading comprehension for students with disabilities.

Additionally, a study conducted by Courtade et al. (2013) investigated the impact of story-based lessons, using early stage GNs for students with autism conducted in three elementary school classrooms. Using a single case design multiple probe across multiple students, to investigate the effects of SBL and GNs on student comprehension results indicated that the use of early literacy GNs increased comprehension and ability to follow steps in a task analysis. The results showed that the story-based lesson large effect size on students across all three classes. While this study was successful, it was focused on using SBL for following steps in task analysis, rather than the impact of GN for reading comprehension.

More recently, Fitchett (2023) conducted an alternating treatment design to identify if high school students with ID answered questions to economics text better when using typical adapted text vs. graphic novels. Results found that use of GN for this content created higher

student engagement. The results did not show a clear difference between the types of text used but did show higher engagement for students when using GN, and higher engagement is consistent with great content acquisition. While this study was recent, it compared two interventions instead of looking at the use of GN on students with ID. More research is needed to identify the impact of GNs on reading comprehension for students with ASD.

While the above studies have provided the field with guidance on the effectiveness of GNs, more research is needed with students with ASD at the middle school age to identify GNs effectiveness on reading comprehension. Given the paucity of research focusing on the use of graphic novels as an intervention to promote reading comprehension for middle school students with ASD, the purpose of this study is to address this gap in literature. This study investigated the effects of Graphic Novels on the reading comprehension of middle school students with ASD. Specifically, the following research questions were the focus of this study:

1) What is the effect of system of least prompts on reading comprehension when using graphic novels with students with ASD?

2) What is the effect of system of least prompts on engagement when using graphic novels with students with ASD?

3) What are the key constituent's perceptions of the use of graphic novels and the outcomes for this population?

Chapter 2. Review of Literature

To understand how graphic novels can impact students reading comprehension it is critical to consider their current standing in education and how we define a graphic novel. A graphic novel is defined by Merriam-Webster as "a story that is presented in comic-strip format and published as a book." (Merriam-Webster 2024) Graphic novels (GN) are written in many genres such as fiction, historical fiction, nonfiction, or biography. This research was inspired by the conversation and increase of availability of GN in education. The use and application of GN in general education and special education will be examined through this review of literature to understand their role in the middle school classroom.

Graphic Novels Increasing Presence

Graphic novels publication has increased in recent years. Brozo et al. (2014) indicates the popularity of graphic novels among youth is undeniable. In fact, sales of GNs in the US and Canada were approaching $400 million in 2009 and has continued to grow since. Comic Book Pro's (2023) staff indicated GNs popularity increased in part due to covid and surge of reading for all Americans' but also due to the production of popular titles being adapted into movies. When graphic novels became more of a serious art form in the 1980's is when they were targeted for adults, but as production grew more titles were produced and written specifically for children. This caused the gap between comic books and works of literature to be bridged and helped GNs become something that was used in the classroom beside traditional literature (Comic Book Pros 2023). The shift of perception of GN into a more serious art form has allowed them to enter school libraries and given educators a chance to explore them as well (Brozo 2014).

Gillenwater (2009) argues that there is a need for the use of graphic novels so that students can practice both visual literacy and print literacy. This skill is presented in the use of

graphic novels provides an in between reading that is not 'proper reading' and not 'genuine viewing'. Miller (2012) also suggest that the use of GNs in the classroom creates opportunities for differentiating instruction, building reading skills, assessing student learning, and examining literary elements. Miller's work states that literature standards for students are complex and the use of graphic novels will support learning on a deeper level for all students. Again, this form of literature can bridge the gap where students of any ability can be supported or further challenged.

Graphic Novels as a Teaching Tool

Although there is a surge in the production of GN in recent years there are educators who are unsure of the role of GN in the classroom or school library. Due to this discourse in the education community several researchers have documented the benefits of the use of GNs in the classroom for students of all ages. Students see greater success when they are offered multimodality texts because they are exposed to that outside of school (Hughes 2011). More research has been conducted recently with a heavy influence on visual literacy and the importance of visual literacy for communication (Hughes 2011).

Brozo (2014) provided guidance for teachers using GNs in their curriculum. Brozo also emphasizes how GNs fits into 21st century teaching, while providing many examples of how GNs can support students who are more likely to have a cell phone in their hand than a book. Guidance for implementing GNs to teach history, math, economics, science, and of course language arts has been highlighted by Brozo. This author was not the only one to provide examples of how GN can be used to teach multiple content areas. Other authors have provided guidance on the use of GNs in teaching. For example, Carano and Clabough (2016) used GN to teach human rights and provide examples of social and emotional lessons. The visual art

provided in GNs supported students understanding of emotion and made an impactful lesson for the students (Carano 2016).

In addition to Bonzo's guidance on how to use GNs for all content areas there are also authors who provide guidance on teaching language arts skills with GNs. Boerman (2020) shared that Shakespeare wrote complex plays to been seen and not read alone, and for that reason we should be using graphic novels in the classroom to teach literacy. He urges teachers to take a static format of literature works and pair them with a visual format to help their students visualize complex writing (Boerman-Cornell 2020).

To gauge the perceptions of GNs among educators Block (2013) conducted a survey. Block surveyed 75 elementary teachers and 26 language arts teachers in middle school settings. The results of the survey showed that teachers were willing to use GN in their classrooms. There was a mixed result indicating that some teachers were already using them, but some were not, and this was due to a lack of knowledge. The teachers also responded with a variety of opportunities to use GN in their class, such as, supplemental reading, motivation for readers, and assisting struggling readers. The study proved that GN are welcome in the classroom for various reasons, and teachers need more information about how to use them. The literature indicates that some teachers simply do not know enough about how to use GN or how GN can support their students.

A comprehensive review of literature by Rosenberg (2018) compiled 15 years of research literature to make a case for the use of GN in the classroom. The findings of the review created four categories for teachers to use GN in the classroom. The four categories included motivation, multimodal, literacy skills, and classroom content area. Motivation is a common theme that appeared in this review as well as other literature cited in this study. There is a frequent link

made between high reading motivation and high literacy skill attainment. This literature review also found a link between high motivation and increased reading comprehension. The implications of this review point to the use of GN to create motivation and improve reading comprehension.

Reading Comprehension Intervention

Reading comprehension has been extensively researched to understand what methods are best to support all students. Several different strategies have been found to be effective. For example, the Prepare, Structure, Read, and Think (PSRT) study by Simons (1989) using a data analysis research design with high school students. This study reviewed the use of this method across high school literature classrooms. This method was found effective for students because it provided four clear and easy steps for teachers to implement. This method is reliant on what is already know, text organization, reading, and then a concluding discussion. By using the PSRT method students were able to see text organization and better understand what they read, and this led to greater comprehension.

The previously mentioned study is just one of many studied methods for reading comprehension. A study by McKeown (2009) used a two year long study with three approaches to review a content focused approach on student comprehension, reading strategy approach, and basal reader approach on 5th grade students from 6 classrooms. Of the three methods used the focused content method was the most effective. In this method, the teachers would ask open ended questions during the reading of the content text to create discussion with the students. The questions and follow up questions created a conversation with the classroom that caused a deeper understanding of the text read.

Over many years there have been several trends for teaching comprehension for students. An additional comprehension strategy used was a story map method conducted by Baumann and Bergeron (1993). The quasi-experimental design used a pretest-posttest method for four elementary classrooms. The results from the study show that the use of story map instruction was effective to improve reading comprehension across all four classrooms. The study highlighted the importance of story mapping with students so they can recognize those story parts as they read and make deeper connections to the text.

Although this method is effective the research is 30 years old. When reviewing the literature for reading comprehension many of the foundational comprehension strategies are older and this makes a case for updating those strategies to include new supports such as GN.

Reading Comprehension for Students with Disabilities

Creation and autonomy play a key role in how students learn and grow. Studies have been conducted to show the importance of promoting reading comprehension for students with disabilities as increased comprehension is shown to lead to stronger post school outcomes, and college trajectory (Mastropieri 1997). In addition, research has shown several interventions to be highly effective for increasing comprehension for students with disabilities.

For example, research has been conducted to demonstrate how technology can impact reading comprehension. A study conducted by Kim (2006) studied the use of computer based collaborative strategic reading on student reading comprehension for students with disabilities. Using between-groups design for 34 students. One group received the computer assisted instruction with collaborative strategic reading and another group did not. The benefit of computer assisted instruction has already been shown to be supportive for students to offer individual pacing and this study used this method to support strategic reading. The result of the

study showed that this strategy was an effective method to support reading comprehension for students with disabilities in elementary and middle school.

Reading Comprehension for Students with Autism

Several studies aforementioned have indicated reading supports for students with disabilities but did not note the difference between students with disabilities and students with ASD. A meta-analysis for reading comprehension skills by Brown et al (2013) highlighted the differences that students with ASD face compared to students with disabilities and noted that there is an increasing number of students diagnosed with ASD. This literature analysis reviewed several reasons that students with ASD need comprehension support such as decoding skills, semantic knowledge, interpersonal knowledge, and performance IQ. The results of the meta-analysis show that current research confirms that students with ASD will more likely than not have problems with reading comprehension due decoding skills, semantic knowledge, interpersonal knowledge, or performance IQ. Each of the three factors were reviewed separately and each indicated a lower level of the skill would create a lower level comprehension skill. The meta-analysis indicated that there is a large base of research for reading comprehension in students with ASD but cover many broad reasons why students with ASD need additional comprehension support.

Additionally, another literature review was conducted by Knight and Sartini (2015) to review research for comprehension strategies in core content areas for students with ASD. Similar to the analysis by Brown et al (2013) the literature review acknowledged that there has been an increase in research to support students with ASD to increase reading comprehension. The review found 13 studies to review and discuss the findings of. The findings of this review indicate that response prompting strategies and visual supports are established forms of

intervention for teaching comprehension skills for this population. Although the review found these methods to be effective there was not enough research to establish specific forms of prompting strategies or visual supports. The results of this literature review suggest that using a prompting system with a GN would create an effective strategy for reading comprehension and support the guiding questions of this study. Of all the research that was looked at for this literature review, none of the studies included the use of GNs.

Graphic Novels for Supporting Reading Comprehension

The popularity of the aforementioned GNs have also been used to support reading comprehension for students. For example, a study by Hughes et al. (2011) used a two-case study research design among two groups of students ages 15-17. The authors implemented the use of GN among two groups of adolescents to study the building of literacy skills such as reading comprehension. Outcomes not only were effective but indicated the importance of GN for several reasons. First the ability to create and write as a model for students has been shown as a benefit of GNs. Students in this study were successful due to their chance to write and create an "autographic". In addition, the creation of their own graphic novel showed skill practice for other literacy skills and created higher engagement. Engagement and motivation are reoccurring discussions in reading and the use of GN.

Additionally, Richardson (2017) conducted a study to test the use of graphic novels as compared to traditional text for reading comprehension. The study used a mixed methods research design and focused on 5th and 6th grade students. Half of the students were given a traditional grade level text and the other half got to select one of 20 different graphic novels. Each group was given a reading comprehension test after completing their book. The results showed an increase in reading comprehension for the 6th grade students, and cited that student

choice for their reading impacted this success. The study highlighted the importance of giving study choice for their graphic novel as it increased motivation and likely supported their increase in reading comprehension scores.

Another example of GNs to support reading comprehension came from Sloboda et al. (2014). This study used a qualitative case study to study the use of GN for students understanding of the text, and additional literacy skills. The study determined that use of GN for elementary students created an excitement for reading, which resulted in a better understanding, text awareness, task awareness, and overall comprehension. Similar to the above study by Richardson (2017) there is a motivation behind their reading that is supporting student success, and this motivation comes from graphic novels rather than traditional text. The Sloboda et al. (2014) study found that graphic novels could be an effective resource for elementary students. Additionally, the authors indicated further research is needed to increase confidence in its effectiveness as a possible resource for students in special education with disabilities.

Graphic Novels for Students with Disabilities

As the potential of GN use in the classroom was explored it was also researched as tool that could support students with disabilities and diverse learning needs. Nicole Fenty et al. (2020) used the connection of motivation and engagement with reading strategies to improve reading comprehension for students with disabilities. The study focused on improving engagement to support fluency and additionally comprehension. She leveraged several foundational reading skills used to support students with disabilities, and increased their success when pairing those skills with highly engaging GN's. Her study also found potential for additional research to teach content outside of reading skills, such as history or science, that would be challenging to students with disabilities (Fenty et al. 2020).

In addition, another study by Hines and Dellinger (2011) focused on graphic novel use for reading comprehension. This study used a quasi-experimental design among 15 students to study the impact of GNs on literacy skills. The study used small groups of 5 students in a literature circle format due to the need for small group setting for the students with disabilities. The results of the study indicate an improvement in comprehension skills for students, and an improvement in student attitude toward reading. The study indicates an increase in comprehension skills and further supports the use of GN to increase motivation for students.

An additional study by Fenty and Brydon (2020) used a mixed methods research design to implement a specific instructional strategy. The instructional strategy used was a comprehensive fluency strategy with six specific steps to be implemented by a teacher for students with disabilities. The focus for this study was the ability of GN to create stronger reading engagement to better support the fluency strategy. The study highlights that not only can GNs create stronger reading engagement but also serve as effective tools to teach complex subject content and create more accessibility to the content for students with disabilities.

Graphic Novels for Students with Autism

Research has shown several ways GNs can be used and that GN can be effective for students with disabilities. Next it was necessary to find research to support GN for students with ASD. The literature was minimal which creates a case for this study to add and fill in the current research gap.

For example, a comparative study conducted by Larson (2019) focuses on the story *A Wrinkle in Time*. The study reviewed how characters were portrayed in the traditional literature form and then the graphic novel adaptation. The study suggested a combination of the traditional text and graphic novel can support comprehension skills for students with ASD. The thesis

argues that using multimodal text is an effective support for literacy skills for students with ASD. Furthermore the conclusion of the thesis calls for additional research to support this conclusion.

In the previous study by Hines and Dellinger (2011) supported the use of GNs for students with disabilities. Among the 15 students used in this study three of them were diagnosed with ASD. That does show a small amount of research that included students with ASD but it was not focused on that population alone. This lack of direct focus on students with ASD further supports the need for research specifically to fill this gap.

Chapter 3. Methods

Participants

Four students were recruited to take part in this study. The teacher selected students for the study based on the following inclusion criteria: (1) receiving special education services due to a diagnosis of ASD, (2) currently enrolled as a student in middle grades, (3) able to answer questions with a verbal response, (4) maintaining consistent attendance by missing no more than 3 full days per month, and (5) eligible for the regular state assessment in the identified region. After students agreed to take part in the study, a meeting was held with parents to explain the study and obtain consent per IRB guidelines. Students were be excluded if they did not have adequate hearing or vision, were English Second Language Learners, or were proficient in listening comprehension. Additional factors were included in participant criteria such as reading comprehension level. The investigator used data taken during the school year. Students who had previous comprehension scores of 60% or lower on class assignments were considered in need of additional comprehension support.

The following students were included in the study:

Mark

Mark was a 13-year-old black male enrolled in 7th grade. He was diagnosed with ASD and Oppositional Defiant Disorder (ODD). Mark attended this separate school due to his maladaptive aggressive behaviors for 2 years. Mark displayed externalizing behaviors when he was escalated. He received daily behavior and social support during his daily academic periods. Mark exhibited challenges with reading comprehension and fluency, as indicated by a fluency assessment reveling his proficiency close to a 2nd grade level. Reading fluency was assessed by using leveled books and reading those for a fluency check every 2 weeks in class.

Peter

Peter was a 11-year-old while male enrolled in 6th grade. He was been diagnosed with ASD and ADHD, and displayed maladaptive behaviors when faced with nonpreferred words or phrases. Peter displayed externalizing behaviors when he was escalated. Peter attended this school placement for two years due to his behaviors that escalate quickly. Academically Peter is a student with strong listening comprehension skills but reading fluency that was on 3rd grade level. Opposed to his listening comprehension skills he has low reading comprehension when working independently. Peter has a below grade level reading fluency due to needs for speech support. Peter read a leveled book every 2 weeks for a fluency check.

Joe

Joe was a 13-year-old while male enrolled in 7th grade. Joe was diagnosed with ASD and anxiety. Joe displayed internalizing behaviors when he was escalated. Due to his extreme anxiety and behaviors due to anxiety he received behavior and emotional support at this separate school setting for 4 years at the time of the study. When faced with new school content or a change in the school day, Joe experienced acute anxiety that impacted his ability to participate in class and complete work. Joe's reading fluency was on the 4th grade level. Joe had reading fluency checked every two weeks with a leveled book. Although this reading fluency was higher his anxiety would cause him to drop words or become lost in the text. He often needs to reread sections of text and this caused him to become upset. This behavior impacted his comprehension and other academic work in school.

Setting

The study took place in a private school setting in a suburban region in the southeast United States. The school has a small population of approximately 100 students with a majority

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Setting

The study took place in a private school setting in a suburban region in the southeast United States. The school has a small population of approximately 100 students with a majority

of the population having an ASD diagnosis. The school emphasized a heavy Applied Behavior

Analysis (ABA) approach to support the reduction of problematic behaviors and increase

academic skills. The study took place in the classroom area. The classroom setting where the

baseline and intervention occurred was a 20x20foot space. The classroom contained 13 student

desk, and three additional tables. There were 9 students in the classroom and 4 staff. The class

had one classroom teacher and 3 support staff. The students in the class worked on a 1:3 or 1:2

ratio due to support needs. Students worked in small groups of 2-3 during academic work with

one staff member in the group with students.

Experimenter

The experimenter, was seeking an Advanced Studies master's degree in special education

and add on licensure in low incidence disabilities in the college of education at a university in the

Southeastern TN. The experimenter conducted all instruction and served as the primary data

collector. The experimenter held a teaching license in grades 4-8, all subject areas for 7 years,

and had seven years of experience of teaching in the intermediate setting as an ELA teacher in a

general education classroom but was in the first year of working in a self-contained class of

students with ASD. This study was conducted for the required thesis, which was a component of

the master's degree.

Experimental Design

This design was a single case multiple probe across participant design (Ledford & Gast,

2019). All participants participated in concurrent baseline data collection for a minimum of 5

sessions. The student with the most low and stable baseline data was be chosen to start

intervention first. All remaining students stopped baseline data collection until the first student

showed a consistent therapeutic effect in intervention. At this point, the students remaining in

baseline were be probed again for 1-3 sessions and the student with the lowest and most stable baseline started intervention next. This continued until all students were in intervention. Once students consistently demonstrated a high level of independent, correct responding, intervention data collection stopped for a minimum of two weeks. After two weeks, maintenance data was collected.

Materials

Materials used for this study were pulled from a historical fiction graphic novel series. The series is *Geronimo Stilton: Graphic Novel*. Each book in the series is focused on a different event or item in history. For this study baseline was conducted using *The First Mouse on the Moon* and intervention was conducted using *The Coliseum Con*. The book series was published by Papercutz. The Lexile level for these books range from 600-680, and this translates to a 2nd-3rd grade level. See Figure 1 for an example page from the GN used. Baseline and intervention texts were equivalent in length and complexity.

Figure 1

GN Material Example Page

Dependent Variable

The primary dependent variable was the percent of questions answered correctly without prompting during a story-based lesson featuring graphic novels. Reading comprehension was measured by calculating the percent of comprehension questions answered correctly without prompts after each session of instruction and divided by the total number of questions asked and multiplied by 100 to get a percent correct for each session. Each session consisted of five comprehension questions that correspond with the text read. The questions aligned with different levels of Bloom's Taxonomy to create rigorous questions. The questions consisted of a literal recall (e.g., "Where did Professor Von Volt want to send Geronimo?), an inferential question (e.g., "Based on Trap's face how did he feel after the final astronaut test?", a sequencing question (e.g., "First Geronimo missed the train, then his boss was angry, what happened after that?"), a synthesis question (e.g., "How does Geronimo show problem solving skills when he was challenged by The Pirate Cats?), and a main idea question (e.g., "What was the main idea in the section we read today?").

The secondary dependent variable was the level of student engagement throughout baseline and intervention. A rating scale was used after each session to indicate the level of student engagement. A 5-point scale was used 1 meaning the student required 4 or more prompts to redirect to the text and questions, 2 meaning 3 prompts were required, 3 meaning 2 prompts were required, 4 meaning one prompt was required, and 5 meaning the student was highly engaged and did not require prompting to redirect to the text. Data was collected after each session to indicate the level of engagement across baseline and intervention phases. A mean score for baseline and intervention was identified for each student to determine if there was a

different engagement during baseline with GNs or intervention with system of least prompts. Engagement scores were also multiplied by 100 to get a percent engaged score.

Response Definitions and Data Collection

The study focused on reading comprehension skills. A response to reading comprehension would be correctly answered multiple choice question with four response options with printed words (i.e., correct answer, a close distractor, another close distractor, and a far away distractor) about a given text. A nonresponse would be an incorrect response for a multiple choice question after waiting a set 8 seconds after presenting the question. Data was coded using the following system: I for independent correct, V for a verbal prompt, M for a model prompt, and a P for physical prompt. If the student did not respond, the next prompt in the hierarchy will be given. Only independent correct responses were included in the percent correct and graphed for that session.

Data Analysis

Visual analysis was conducted daily by comparing data within phases of the study. As well as across adjacent phases and tiers. Visual analysis was used to determine if changes in outcomes occurred as a result of the IV being manipulated. Per WWC recommendations data was analyzed within phases to asses changes in level, trend, variability, overlap, and similar data patterns(WWC, 2010). Effect size was calculated in two ways. The first way is the use of percent of nonoverlapping data (PND). For calculating PNDs for each participant, a PND calculator was used (Tarlow & Penland, 2016). PND scores ranged from 0%-100%. Scores 90% and above indicated that the intervention was highly effective, 70%-89% indicated that the intervention was moderately effective, 50%- 69% indicated a possible, but questionable effect, and below 49% indicated an intervention that was ineffective (Rakap, 2015). Due to the known limitations of the

PND effect a second measure was used. The second method used for calculating effect size was Tau-U calculator (Vannest et al., 2016). The Tau-U calculator was used to calculate effect size for single case research designs (Vannest et al., 2016). Tau-U scores of >0.8 indicated a large effect, >0.5 indicated a medium effect, and >0.2 indicated a small effect.

Interobserver Agreement

IOA was collected for a minimum of 20% of all sessions across all participants for both the primary and secondary dependent variable. IOA was be set for a minimum of 90% agreement. The experimenter and a trained paraprofessional conducted all IOA sessions. If IOA dropped below 90% agreement, additional training was set to occur to discuss areas of discrepancy and confusion. IOA was conducted by using item by item agreement where the number of agrees will be divided by the number of agrees plus disagrees and multiplied by 100.

Social Validity

Social validity was collected with all constituents (e.g., paras, students, guardians) to identify perceptions of the process and outcome. All constituents were given a survey with questions about the process and outcome using a 5-point Likert scale from strongly agree to strongly disagree. Process questions consisted of questions like 'Did you think the system of least prompts was effective for teaching comprehension of graphic novels to the students?'. Outcome questions will consist of questions like 'Do you think the results of the study were worth the instruction used to teach comprehension?'. Students were given questions suitable for their age and provided with a smiley face, a neutral face, and a frowny face to indicate their thoughts on the process and outcomes.

Independent Variable

The independent variable was the use of system of least prompts being applied to graphic novels. After reading the graphic novels, the student was asked 5 comprehension questions. When the researcher presented a question, a 5 second wait time occurred. If no response was provided, or an incorrect response was provided, the experimenter provided a verbal prompt (i.e., Let's reread) by rereading targeted text (a paragraph) that alluded or contained the answer and the question and response options were represented. If the student still did not respond or responded incorrectly after 5 seconds, the experimenter gave a model prompt by rereading the targeted line that contained or alluded to the answer and modeled the correct response. The experimenter then re-asked the question and represented the response option and waited 5 seconds. If the student still did not respond or provided an incorrect response, the experimenter showed the targeted answer in the text and physically prompted the student to the answer and the trial was over. This same procedure occurred for all comprehension questions.

Procedural Fidelity

Procedural Fidelity (PF) was collected for a minimum of 20% of all sessions across all students. A trained observer collected data on the experimenter to see if all steps of the intervention were implemented as intended. The number of steps correctly implemented was divided by the total number of steps to be implemented and multiplied by 100. PF was set at 90% or higher. If the PF dropped below 90%, the experimenter and the trained observer went back over the steps of the intervention and role-played until the experimenter and the trained observer achieved a minimum of 90% PF.

Procedures

Baseline

  The experimenter randomly picked a graphic novel to be read with the targeted student and followed it with the five targeted questions. The system of least prompts was not used during this phase; instead, the experimenter asked the targeted question and waited 5 seconds for a response. The experimenter recorded a correct or incorrect response and continued on. Praise was only given for participation and not for correct responses. Error correction did not occur in baseline. A minimum of 5 baseline sessions were conducted with all participants, and the student with the lowest and most stable baseline started the intervention first. All remaining participants stopped with baseline probes.

Intervention

  During intervention, a graphic novel was randomly selected from the set of graphic novels. The graphic novel was read aloud by the student to the investigator, and at predetermined parts, each question was asked. As described above, a five-second wait time was given, and if no response occurred, the experimenter provided the first-level prompt in the system of least prompts. This continued until the student answered correctly or the most intrusive prompt was given. The student continued in baseline until a consistent therapeutic effect was demonstrated. At that point, the students in baseline were probed to determine if all were still low and stable. The student with the most low and stable trend entered intervention next. This continued until all students were in the intervention. Once a student in the intervention consistently got at least 4 out of 5 answers correct (i.e., 3 consecutive trials), data collection stopped for a period of time to allow for a maintenance check.

Maintenance

Once students in the intervention consistently responded with an independent correct response to all 5 comprehension questions (e.g., 3 consecutive sessions), data collection and intervention stopped. A minimum of two weeks later, maintenance data were collected. Maintenance conditions were the same as baseline conditions.

Chapter 4. Results

Overall Summary

This study sought to answer the question of what effect graphic novels and the system of least prompts have on reading comprehension (RC) in middle school students with ASD. The results show there is a functional relation between the IV of GNs and the DV of RC. Additionally, the second research question explored what effect graphic novels had on engagement of middle school students with ASD. The results showed increased engagement with the graphic novel text. Finally, this study looked at perceptions of the use of graphic novels and outcomes for this population. Overall students indicated liking GNs and felt GN increased their understanding of the text. Teacher responses indicated that they were unsure of the possibility of GN use for the classroom but are optimistic about their use as a support for reading comprehension. A fourth student was included in the baseline treatment but not included in the intervention due to high baseline levels. During baseline collection the students showed higher scores than expected based on their comprehension data taken in the classroom prior to the study. This increase in student baseline scores is likely due to the awareness of being observed, or the Hawthorne effect.

Mark

In baseline, Mark had overall variable data with data ranging from 80% correct to 20% correct (M=45%). Given Mark had a descending trend on the last 3 data points, the decision was made to bring him into intervention. In intervention, Mark's data started off with high variability with data similar to baseline levels. Eventually Mark demonstrated an increasing level, but continued with a variable trend, although in the last 4 data sessions, Mark performed 100% correct for 4 consecutive sessions. His mean intervention data was 71% with a range of 10% to

100%. In regard to effect size, Mark had 35% PNDs which indicated an ineffective intervention. Yet PND has been found to an inaccurate measure of effectiveness when skill acquisition builds over time (Ledford & Gast, 2019). When calculating the Tau U effect size, Mark had a score of 0.527 indicating a medium effect.

Regarding engagement, in baseline Mark had variable data that mirrored his reading comprehension scores. Scores ranged from 100% to 20% engagement (M= 48%). In intervention Mark had engagement scores that ranged from 100% to 20% engagement (M= 69%). Mark's engagement scores indicate an increase in engagement during intervention with the support of the prompting system.

Peter

In baseline, Peter had data ranging from 60% correct to 20% correct (M=40%). Given Peter had a descending trend on the last 2 data points when re-probed in baseline, the decision was made to bring him into intervention. In intervention, Peter's data started low with data similar to his last two baseline points. Eventually Peter began to demonstrate an upward trend in data with his last five points consistently at 100%. His mean intervention data was 71% with a range of 20% to 100%. In regard to effect size, Peter had 59% PNDs which indicated a questionable effect. Yet PND has been found to an insufficient measure of effectiveness when skill acquisition builds over time (Ledford & Gast, 2019). Although the PND for Peter was larger than PND for Mark, which indicates a larger possibility of effect for Peter. When calculating the effect size, Peter had a score of 0.282 indicating a medium effect. See Figure 2 for data.

Regarding engagement, in baseline Peter had low scores consistently. Scores ranged from 60% to 20% engagement (M= 31%). In intervention Peter had engagement scores that ranged from 100% to 20% engagement (M= 56%). Peter's engagement scores indicate an increase in

engagement during intervention with the support of the prompting system. Although there was an increase in engagement with prompting, his engagement was consistently lower than the other participants.

Joe

In baseline, Joe had data ranging from 100% correct to 20% correct (M=63%). Given Joe had a descending trend on the last 2 data points when re-probed in baseline. Joe continued to show baseline data when probed again, and that is when he was brought into intervention. During intervention, Joe's data quickly showed an upward trend. His mean intervention data was 73% with a range of 40% to 80%. In regard to effect size, Joe had 0% PNDs which indicated an ineffective intervention. Yet PND has been found to an inaccurate measure of effectiveness when skill acquisition builds over time (Ledford & Gast, 2019). When calculating the effect size, Joe had a score of 0.282 indicating a medium effect based on the Tau U calculator .See Figure 2 for data.

Regarding engagement, in baseline Joe had variable data. Scores ranged from 100% to 20% engagement (M= 51%). Joe's engagement, mirrored his RC scores, and often followed a trend of his anxious and maladaptive behaviors. On very anxious days his session engagement was lower, but on days where he felt calm his engagement was much higher. During intervention Joe showed an improvement in engagement. Scores ranged from 40% to 100% (M=73%) and followed his intervention data. His overall engagement showed a increase during intervention. For all participants data see Figure 2.

Figure 2

Percent of Unprompted Correct Comprehension Questions
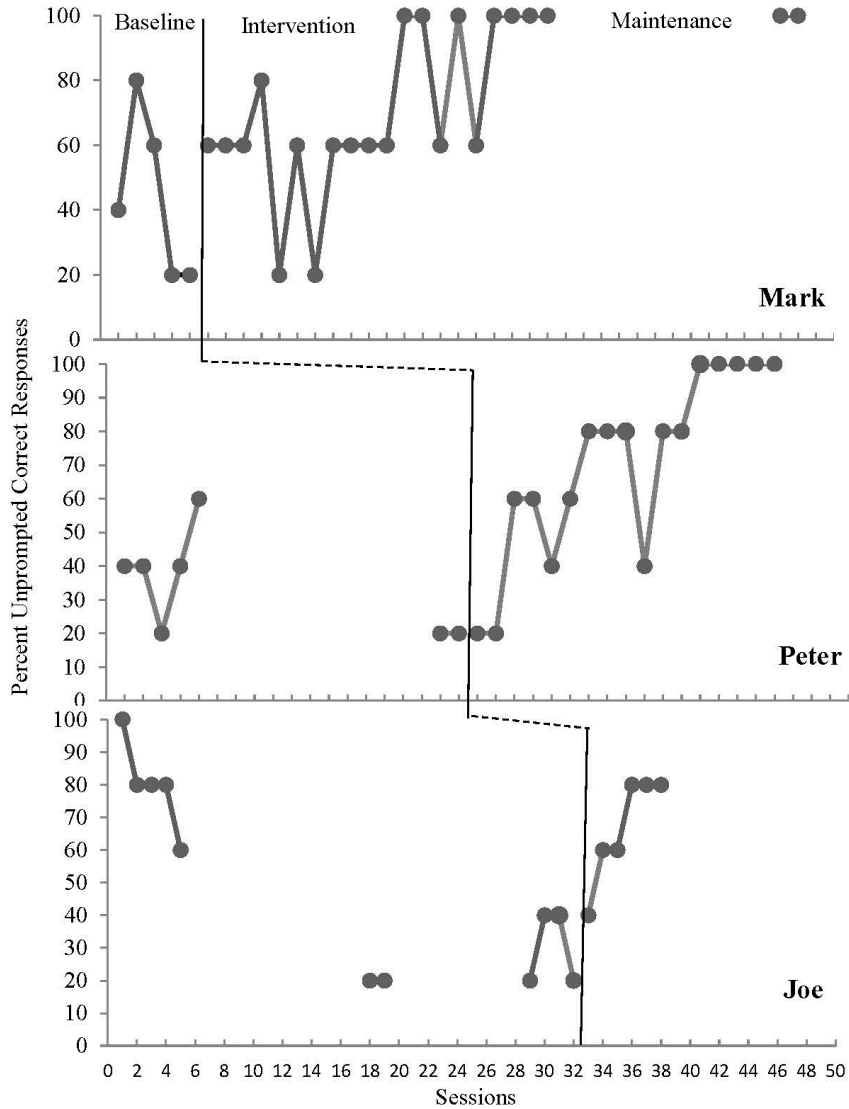
Social Validity

To assess the perceptions of GN use to support reading comprehension the parents, paraprofessional, and students were given a survey. The parents of participants were surveyed first. The parents' answers varied but majority of answers indicated they felt positively about the use of GN for their student. For example, when asked "*GNs are a strong alternate literature*

resource for your student?" two parent responses indicated that they agreed this was alternate literature source, and one parent strongly agreed. Additionally, when asked "*I will offer my student GNs to read at home.*" one parent response indicated that they strongly agreed, one parent agreed, but one parent marked unsure.

The paraprofessional who helped with PF and IOA was also surveyed. This paraprofessional indicated they agreed that GNs and the system of least prompts were beneficial to the student and supported their reading comprehension. For example, when asked "*The student was highly engaged with the GN text presented.*" the response was strongly agree. In addition, when asked "*The system of least prompts supported student* learning" the response was strongly agreed. When going over the survey the paraprofessional stated they have not seen system of least prompts used for the middle school age group and thought it was extremely help for all three of the students.

The students were surveyed about their perception of GN for reading. The students agreed that they enjoyed reading GN more than the standard class novel. When asked "*I enjoyed Geronimo Stilton more than other stories we read this year*" all three students answered yes! The students had varied answers when asked if they felt they were stronger readers after participating. When asked "*Now I feel like a stronger reader because Miss Rachel used prompts*". Mark and Joe's response was strongly agreed, but Peter answered that he was unsure. See Table 1 for a summary of the social validity measures from parent responses.

Table 1

Parent Social Validity Responses

Question	Responses				
	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
GN are a strong alternate literature resources for your student	33%	66%			
Prior to this study, my student read GN on their own				33%	66%
I will offer my student GN to read at home	33%	33%	33%		
I will read GN with my student at home		33%	66%		
After the study I think GN are helpful to use in the classroom		100%			

Procedural Fidelity (PF) and Interobserver Agreement (IOA)

Interobserver agreement was taken once on approximately every 5 sessions for a total of 20% of the sessions across the study. IOA was set at a minimum of 90% agreement across all sessions. IOA for the study was at 100% for every session for each student across baseline and intervention sessions. PF was taken at the same time as the IOA for a total of 20% of the sessions. PF was set at 90% or higher for all sessions. PF was 100% for every session.

Maintenance

After completion of the intervention phase, maintenance data was collected approximately two weeks later. Due to time constraints to begin data collection there was only time to collect maintenance data for one student. Mark's maintenance data was collected twice during the final week of Joe's intervention collection. The maintenance data analysis indicated that Mark maintained his reading comprehension success. His data was strong at 100% questions correct with out prompts and consistent with both points at 100%.

Chapter 5. Discussion

The purpose of this study was to investigate the effect of graphic novels on reading comprehension for students in middle school with ASD. Specifically, the research was focused on answering the following questions:

1. What is the effect of system of least prompts on reading comprehension when using graphic novels with students with ASD?

2. What is the effect of system of least prompts on engagement when using graphic novels with students with ASD?

3. What are the key constituent's perceptions of the use of graphic novels and the outcomes for this population?

Discussion of the findings are organized by the participants, followed by the impact of student engagement, and finally the social validity, limitations, implications for future research, and conclusion.

Mark

Mark displayed a lot of variable data which was similar to his engagement data path too. In baseline Mark had higher data than anticipated, of the three participants Mark had the lowest fluency and comprehension prior to the study. During baseline it is possible that his increased data was due to knowing that he was being observed, which can be a threat to internal validity called the Hawthrone effect. The later baseline data are more typical of Marks responses to comprehension questions. Additionally, on days where he had to be prompted to redirect focus back to the text or questions is when a dip in his score was seen. There were two significant dips in the data during invention for Mark (i.e., session 10 and session 12), and those are likely due to the school schedule and student attendance. The first drop in intervention data, session 10,

occurred after the student missed two days of school due to illness and returned to school on an early dismissal day. It is rare for the student to miss school. Mark experienced challenges upon the return to school. The second drop in intervention data, session 12, occurred after an extended weekend break. After those days the school did not have any extended weekends and the student data began to trend upward due to the consistency of school occurring daily. Mark's data was impacted by his maladaptive behaviors where were externalized. His externalized behaviors make an impact on his engagement and academic success.

Overall, the student was very eager and happy to work, but changes in schedule may have contributed to student performance. Although Mark was the most eager to work and engaged, he took the longest during intervention to demonstrate a consistent data pattern.

Peter

Peter had data that showed a more consistent upward trend after starting intervention. During baseline, at session 5, Peter had a score that went upward above his previous scores. Due to that he was not considered to be brought into intervention. The variable baseline data for all the participants is thought to be due to knowing they were being observed or the Hawthorne effect. When he was probed again at baseline he showed low scores and then was able to be entered into the intervention phase. During intervention his data showed a consistent upward trend, and his intervention took less time to prove an effective intervention. During Peter's 10th intervention session he had a dip in his data, and this is due to an escalation in behavior. On this day the staff was wearing green for a school spirit week and this color is nonpreferred for the student. He had a challenging day in school and his data reflected that. Peter did have the most variability in his engagement scores. His engagement was inconsistent, and this is similar to his behavior during classroom instruction. Peter's data was impacted by his maladaptive behaviors

where were externalized. Similar to Mark, Peter's externalized behaviors impact his engagement and academic success.

Joe

Joe had baseline data that started very high and then quickly had a downward trend and stayed low. Although Joe had a higher fluency than other participants in the study his baseline was higher than expected. It is possible his baseline was higher due to knowing he was being observed or the Hawthorne effect. Joe was the last to enter intervention due to the initial baseline scores that were high. Joe has stronger fluency skills than the other students and this is a possible reason for his baseline scores. During intervention Joe had an upward trend in his data pretty quickly. Joe responded well the knowing that if he did not know that I could provide him a prompt, and the system of least prompts gave Joe excellent support during his anxious moments.

Joe's engagement scores mirror his scores as well. When he is highly engaged he has strong comprehension scores. When Joe displayed anxious behaviors, he had to be prompted to return to the text frequently, and this made an impact on his comprehension. Unlike his counterparts in the study, Joe has behaviors that are internalized. This could be a reason that his fluency score was higher prior to the study, and could be related to the quick success in the intervention phase.

This study adds to the literature by further contributing to current literature to support the use of GNs for reading comprehension for students with ASD. The study by Brennan (2013) addressed the use of GN to support reading comprehension but did not address how GN can specifically support students with ASD. The findings in that study as well as this one address student engagement to support reading comprehension. A study by Courtade et al. (2013) did focus on students with ASD and how to support reading comprehension but this study was

focused on story-based lessons and not GNs. An additional study by Fitchett (2023) was focused on the use of GN for students with disabilities, but again this study and the others aforementioned did not focus on the questions of this study. The current literature has several supports for GNs, reading comprehension, and supporting students with ASD but so few cover all three topics. Which is why this study was needed to help fill a gap in the current research.

Limitations

There were a few limitations to consider when interpreting the results of the study. First, the sample size of the participants for the study was small. This is a common limitation in single case research designs and limits the generalization of this data to other settings. A second consideration is the participants used for the study. It is possible they needed additional screening before beginning the study. The participants were selected out of a class size of 9 and with several requirements the selection for the class was limited. While the participants met the study inclusion requirements, they still exhibited high baseline data. There was a 4th participant probed in baseline, but this participant had baseline data that was consistently too high to warrant inclusion in study. Mark, Peter, and Joe started with higher baselines which impacted the PNDs but eventually trended down warranting inclusion in the intervention. As indicated by Ledford and Gast (2019) PND can be a flawed measure of effect. These higher than expected initial baseline levels may have been due to the novelty effect threat to internal validity.

There are two possible causes for the higher baseline data. One, which has been previously stated, is the Hawthrone effect. This threat to internal validity is seen when participants are aware they are being observed and trying to please the interventionist. An additional impact to the baseline could be the classwork prior to the study. Before starting baseline data collection for the study, the class read a traditional literature novel together. For the

students in the class, it was likely their first novel study, and this would be likely to increase their literacy skills. It is also possible that due to the size of the classroom and the data collection process that students were exposed to baseline questions prior to their baseline. Although this was attempted to be avoided it is a reality of research in a natural setting.

Future Research

As future studies on reading comprehension and GN are conducted, we will gain a better understanding of how students are shaped by this mode of reading. Based on the results of this study a few suggestions for future research will be made. First, future research should be conducted on the effectiveness of the intervention on students reading comprehension vs. just listening comprehension. Second a more longitudinal study would be helpful to identify long term effects of GNs on students reading comprehension. This study offers a small picture of this support for reading comprehension, but if used with a longitudinal study the sustainability of GN for reading comprehension over time could be observed. Another suggestion for future research would be to investigate the effect of this method for students in the general education classroom, and measurements of their incidental learning of additional vocabulary and core content in classes due to the use of GN practices to improve reading comprehension. Finally, future research should investigate this strategy's use in group instruction vs. one-on-one instruction as group instruction is more efficient use of time in the classroom.

Implications for Practice

When reviewing the existing research and the additional contribution of this study there are implications that can be made for the use of GN in the classroom to support reading comprehension. By addressing the practical implications of GN in the classroom for students with ASD this work can empower educators to make informed decisions to support their learners

who have unique or diverse needs. This study can help educators see that incorporating GNs into content curriculum can support students and offer a different way to access their literature. Providing a variety of literature options and GN selection can cater to the different interest of students and create a higher level of engagement. An additional implication based on this study would include the opportunity to use GN for explicit instruction on visual literacy. Students with ASD need additional support to understand emotions and context clues, and GN can offer a support to use visual literacy to instruct on these specific elements of reading. A final implication could be the use of GN to support individual instruction and progress monitoring for reading comprehension. Many schools offer supports for reading comprehension for students and this study can make the case for the use of GN in those comprehension intervention programs.

Summary

In conclusion, this study adds to the literature and discussion of the use for GN in the classroom. This study highlights the opportunities for the use of GN to support students with ASD, and the results suggest that GN are a support for reading engagement. Despite the variable outcomes and effect size, the results and study highlight the importance of continuing to explore strong instructional practices to promote comprehension for students with ASD.

<div align="center">**References**</div>

Baumann, J. F., & Bergeron, B. S. (1993). Story map instruction using children's literature:

    Effects on first graders' comprehension of central narrative elements. *Journal of Reading*

    Behavior, *25*(4), 407-437.

Block, K. (2013). Teacher perceptions of graphic novels. *Graduate Research Papers, 31*.

    https://scholarworks.uni.edu/grp/31

Boerman-Cornell, W., & Kim, J. (2020). Using graphic novels in the English language arts

    classroom. Bloomsbury Publishing.

Brennan, B. (2013). How graphic novels support reading comprehension strategy development in

    children. *Literacy*, *47*(2), 57-112. https://doi.org/10.1111/j.1741-4369.2011.00655.x

Brown, H. M., Oram-Cardy, J., & Johnson, A. (2013). A meta-analysis of the reading

    comprehension skills of individuals on the autism spectrum. *Journal of autism and*

    developmental disorders, *43*, 932-955.

Carano, K., & Clabough, J. (2016). Images of struggle: Teaching human rights with graphic

    novels. *The Social Studies, 107*(1), 14-18.

    https://doi.org/10.1080/00377996.2015.1094723

Courtade, G. R., Lingo, A. S., & Whitney, T. (2013). Using story-based lessons to increase

    academic engaged time in general education classes for students with moderate

    intellectual disability and autism. *Rural Special Education Quarterly, 32*(4), 3-14.

    https://doi.org/10.1177/875687051303200402

Fenty, N. S., & Brydon, M. (2020). Using graphic novels to engage students with learning

    disabilities during fluency instruction. *Intervention in School and Clinic*, *55*(5), 278–285.

    https://doi.org/10.1177/1053451219881749

Fitchett, C. M. (2023). Using graphic novels to teach economics content to high school students with extensive support needs (Doctoral dissertation). Retrieved from https://doi.org/10.18297/etd/4171

Gillenwater, C. (2009). Lost literacy: How graphic novels can recover visual literacy in the literacy classroom. *Afterimage, 37*(2), 33-36. https://www.proquest.com/scholarly-journals/lost-literacy-how-graphic-novels-can-recover/docview/212089837/se-2

Hairston, A. (2011). Identifying and helping struggling readers. *Journal of the American Academy of Special Education Professionals, 1*(1), 27-33.

Hines, S., & Dellinger, K. (2011). The impact of reading graphic novels on student motivation & comprehension. Working paper. Appalachian State University.

Hughes, J. M., King, A., Perkins, P., & Fuke, V. (2011). Adolescents and "autographics": Reading and writing coming-of-age graphic novels. *Journal of Adolescent & Adult Literacy, 54*(8), 601-612. https://doi.org/10.1598/JAAL.54.8.5

Knight, V. F., & Sartini, E. (2015). A comprehensive literature review of comprehension strategies in core content areas for students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*(5), 1213-1229. https://doi.org/10.1007/s10803-014-2280-x

Larson, Marla. (2019). A Wrinkle in Autism Literature: An Analysis of Madeleine L'Engle's A Wrinkle in Time and Hope Larson's A Wrinkle in Time: The Graphic Novel (Master's thesis). Retrieved from https://scholarworks.gvsu.edu/theses/970

Ledford, J. R., & Gast, D. L. (Eds.). (2018). *Single case research methodology* (3rd ed.). Routledge.

Mastropieri, M. A., & Scruggs, T. E. (1997). Best practices in promoting reading comprehension

  in students with learning disabilities 1976 to 1996. *Remedial and Special Education,*

  18(4), 198–213

McKeown, M. G., Beck, I. L., & Blake, R. G. K. (2009). Rethinking reading comprehension

  instruction: A comparison of instruction for strategies and content approaches. *Reading*

  Research Quarterly, 44(3), 218–253. http://www.jstor.org/stable/25655454

Merriam-Webster. (2024). Graphic novel. In *Merriam-Webster.com dictionary*. Retrieved

  February 12, 2024, from https://www.merriamwebster.com/dictionary/graphic%20novel

Miller, A. (2012, January 11). Using graphic novels and comics in the classroom. *Edutopia*.

  https://www.edutopia.org/blog/graphic-novels-comics-andrew-miller

Nation, K., Clarke, P., Wright, B., & Williams, C. (2006). Patterns of reading ability in children

  with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 36*(7),

  911–919.

Randi, J., Newman, T., & Grigorenko, E. L. (2010). Teaching children with autism to read for

  meaning: Challenges and possibilities. *Journal of Autism and Developmental Disorders,*

  40(7), 890-902. https://doi.org/10.1007/s10803-010-0938-6

Richardson, E. M. (2017). "Graphic novels are real books": Comparing graphic novels to

  traditional text novels. *Delta Kappa Gamma Bulletin, 83*(5), 24-31.

  https://www.proquest.com/scholarly-journals/graphic-novels-are-real-books-

  comparing/docview/1929675667/se-2

Rosenberg, B. (2018). *A case for the inclusion of graphic novels in the classroom*. Bank Street

  College of Education. Retrieved from https://educate.bankstreet.edu/independent-

  studies/225

Tarlow, K. R. (2016). Baseline Corrected Tau Calculator. http://www.ktarlow.com/stats/tau

Tarlow, K. R., & Penland, A. (2016). *Percentage of Nonoverlapping Data (PND) Calculator*.

http://www.ktarlow.com/stats/pnd

The rise of graphic novels: Exploring the intersection of literature and art: Comic book pros.

RSS. (2023, May 17). https://www.comicbookpros.com/post/the-rise-of-graphic-novels

Sloboda, M. A., Brenna, B. A., & Kosowan-Kirk, C. (2014). Comprehension strategies in

practice through a graphic novel study. *Journal of Reading Education, 39*(2), 17–22.

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                                 Fitsanakis, V. A. (2018). Chronic exposure to a glyphosate-

                                 containing pesticide leads to mitochondrial dysfunction and

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