THE EFFECT OF RACE REPRESENTATION ON READING COMPREHENSION

By

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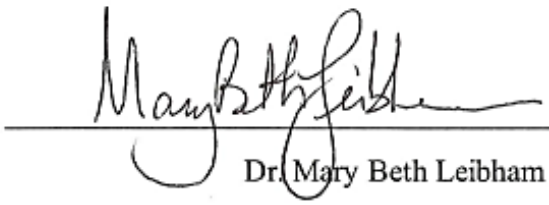

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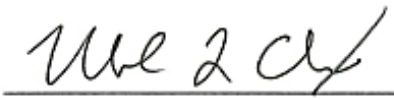

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The Effects of Race Representation on Reading Comprehension

By

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Under the supervision of Dr. Mary Beth Leibham

The achievement gap is still prevalent in that racial minority students, particularly Black students, tend to have lower grade point averages and test scores than their White peers. The current study examined the impact of race representation in children's literature on 4th grade students' reading comprehension and reading preference as a way to support those impacted by the academic achievement gap. The effect of the race of a character on reading comprehension was measured through an experimental group design. A total of 110 4th grade students read two MAZE comprehension passages with pictures of characters of different races and selected words that best fit throughout the story. Black students performed significantly better on the stories with a character that matched their race, but White students did not perform notably differently on the stories with a character that matched their race. There were no significant findings regarding whether students were more likely to prefer the stories with race-matched characters. The limitations, implications, and directions for future research are addressed.

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INTRODUCTION

Statement of Problem

The National Assessment of Educational Progress (NAEP) describes academic achievement gaps as occurring "when one group of students consistently outperforms another group of students and the difference in average scores for the two groups is statistically significant" (NAEP, 2022). The difference in academic achievement between students of different races or ethnicities has been well established and observed. Achievement gaps have been documented for over 40 years, particularly among White, Black, and Hispanic students. Professor Lawrence Stedman noted that in 1977 Black and Hispanic students were performing at rates similar to students years younger than them (Ladner & Burke, 2010). Reardon et al. (2014) reported achievement gaps between White and Hispanic students and White and Black students in 95% of the school districts they studied. Quinn (2014) reported a difference between Black and White kindergarten students' math and reading test scores, indicating this problem can start at young ages and persist over time. Further, the gap has been found in many aspects of academics. Data have revealed significant differences in grade point averages, standardized test scores, dropout rates, and even the frequency of being held back a grade between White and minority students, where minority students consistently have lower performance (Jeynes, 2015).

The achievement gap has been found to be present and impactful in many areas, but understanding why the gaps are occurring is complicated. There are various factors that have been identified as relating to achievement. Broad cultural values of academics, government funding across many levels, and state academic standards can play a role (Becker & Luthar, 2002). More directly, qualified and prepared teachers, parental support and involvement, and student mental and physical health are all seen as factors that can contribute to student

achievement (Basch, 2011; Beckar & Luthar, 2002). It is likely that there will need to be changes made across many levels and factors to see an impactful and lasting change on student achievement, as there does not seem to be one singular feasible and long-term solution to the persistent academic achievement gap. Perhaps, though, there are small changes that can be made to help support students' academic achievement and diminish the gap. This study examined the role that reading materials, specifically race representation in literature, play in reading comprehension. Reading comprehension, in turn, likely contributes to academic achievement.

Reading

While there are many factors associated with the academic achievement gap, reading is of great importance and could thus be a viable area to focus on to improve overall student achievement. Reading skills are necessary for much more than English Language Arts classes. For example, writing is closely connected to reading, and students who struggle with reading are likely to have difficulties in writing as well (Graham et al., 2021; Kim & Graham, 2022). Reading skills are also associated with math (Cimmiyotti, 2013; Vilenius-Tuohimaa, et al., 2008). As math content becomes more complex, students must rely on reading skills to work through story problems and comprehend multistep problems. There is also an established link between reading and science performance (Cromley, 2009), due to similar demands regarding comprehension of materials. Simply put, poor performance in reading can lead to poorer performance in other academic areas.

While reading comprehension is seen as the "ultimate goal" of reading (Nation & Angell, 2006), and important for other academic areas, reading itself is comprised of multiple skills. Phonological and phonemic awareness, phonics and decoding, fluency, and even foundational abilities like vision, hearing, and attention play a role in reading successfully (Bray, 2013).

Gough and Tunmer (1986) proposed a "simple view of reading" where reading as a whole is the product of decoding skills and comprehension. This idea states that reading takes place when the student is able to both decode and comprehend text. Here, decoding is seen as the quick and accurate pronunciation of words and the link between the sounds and spelling of words while comprehension is the understanding of what has been read. Comprehension, or understanding and taking meaning from what has been read, is a complex process (Perfetti et al., 2005) and is both developed and utilized for years throughout the school career. Because of the importance of reading and reading comprehension, perhaps altering the reading materials available to students, such as increasing racial representation in literature, can enhance comprehension and thus academic achievement.

Representation in Literature

Unfortunately, like the discrepancy in academic achievement, there is also a major disparity in the representation of race/ethnicity in children's books. It has been estimated that 50% of the main characters in children's books in the United States are White (Huyck & Dahlen, 2019) The next most frequent protagonist was found to be an animal or other nonhuman creature, at 27%. Only 10% of children's books depicted African/African American main characters. Asian Pacific Islander/Asian Pacific American characters were seen in 7% of the books, Latinx characters in 5%, and American Indians/First Nations in just 1% of children's books (Huyck & Dahlen, 2019).

Further, in an examination of literature assigned to eighth graders, the majority, 80%, of the protagonists in the books were White. Black protagonists were found in 12% of the books and Hispanic main characters were seen only 2% of the time (Northrop et al., 2019). A 2017 analysis of picture books revealed that it was four times more likely the main character would be

a dinosaur than a child of American Indian heritage and two times more likely it would represent a rabbit than an Asian/Pacific child (Gomez-Najarro, 2020). Another study found that only 5.7% of the books in schools' classroom libraries included at least one leading character or subject identified as belonging to African American, American Indian, Asian/Pacific American, Latino/a American, Middle Eastern American, or mixed-race American cultures (Crisp et al., 2016). This study considered 11 early childhood sites and the libraries within them. The classrooms were racially diverse but had predominantly served African American children, further exaggerating the disparity of representation in the available literature. Belonging to multiple race or ethnicity groups potentially complicates the issue, as representation of mixed-race protagonists is also lacking. Chaudhri and Teale (2013) found just 90 books, or only 1% of published books targeted for 9–14-year-olds, that featured "racially mixed people."

Award winning literature often influences what teachers include in their classrooms or in the curriculum. However, analyses show that there is further disparity between races represented in award-winning literature as well. Considering Newbery Medal-winning literature, 70.8% of the human main characters were White, 10% of the characters were Asian, 8.3% were Black, 2.5% were Latinx, and 5.9% were either Middle Eastern, American Indian, or Island Born characters (Koss & Paciga 2020). Similarly, narrators of Printz Award winning stories are predominantly White, at 67%, followed by 14.3% African American, 4.4% Hispanic/Latino, and 9.9% Asian (Dubroc, 2020). Altogether, there is a considerable lack of diversity present in children's reading materials.

Illustrations, Neurocognition, and Comprehension

Working to increase the representation of different races in reading materials can be approached in various ways. For example, a story may explicitly state the race of the character.

Additionally, materials could include an illustration depicting the character. Illustrations in general can have a positive impact on reading, too. The inclusion of pictures or illustrations with text can increase the retention and recall of the information in said text (McDaniel & Waddill, 1994; Peeck, 1974). Representative illustrations in children's books can help them determine the meaning of new words, which further enhances comprehension (Nevills & Wolfe, 2004). Because comprehension requires building "coherent mental representations" (Gernsbacher, 1995) or "mental models" (Johnson-Laird, 1983), researchers theorize that as readers take in new information, they redesign the cognitive representations or models to continuously add to and update their comprehension and understanding (Zwaan & Madden, 2004). Various skills are involved in redesigning and updating comprehension while reading, such as activating relevant information and suppressing information that is less relevant in order to make connections or inferences (Pike et al., 2009).

When readers attempt to determine what information is relevant and what information they can disregard, they utilize contextual clues and cues, one of which may be illustrations (Pike et al., 2009). Relevant illustrations may facilitate comprehension by giving readers a visual representation of what information is worth focusing on, and they could also reduce demands on working memory to aid in understanding (Marcus et al., 1996). If working memory is overwhelmed, new information may not be able to be taken in as efficiently. Pictures can support the reader as they process information, decide which information is relevant, and efficiently add that information to their understanding. Regardless of the way in which illustrations support comprehension, the addition of graphics, including pictures or realistic illustrations, have a generally positive effect on students' reading comprehension (Guo et al., 2020)

Using relevant illustrations should assist readers in measures of comprehension, but when the illustrations depict characters that match the race of the reader there may be additional benefits. In particular, humans are more likely to spend more time looking at images of faces in comparison to other visual stimuli (Bindemann et al., 2007; Theeuwes & Van der Stigchel, 2006). Visual attention can influence both engagement and comprehension, as students are more visually engaged with certain images, such as faces, and thus taking in that information and using it to develop their understanding of materials. What's more impactful, research has also revealed that people are able to recognize faces depicting their own race faster and more accurately (Zhou et al., 2018). This could mean that when children see illustrations of characters that match their race, they could potentially take in the information more efficiently and effectively than when the character is another race. Books and stories with pictorial depictions of race matched individuals may improve students' comprehension.

Engagement, Motivation, Identity, and Reading

While illustrations and race matching may have cognitive benefits to reading, they could also contribute to increased engagement. Newmann et al. (1992) defined engagement as "the student's psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote." A link has continuously been found between engagement and academic performance, indicating that engagement is necessary for learning (Christenson et al., 2013). In fact, lower engagement in school may be another factor contributing to the achievement gap (Connell et al., 1994; Steele, 1997). Engagement in reading specifically has been found to relate to higher test scores, GPA, comprehension, and better summer retention (Christenson et al., 2013). Given that engagement is highly influenced by motivation to participate in learning, increasing motivation is one way to

increase academic engagement (Christenson et al., 2003). While motivation has numerous theoretical conceptualizations, such as intrinsic and extrinsic motivation theory, self-determination theory, and the ARCS model, it can be seen as what causes or triggers a behavior, leads to the continuation or maintenance of goal-oriented behavior, or the reason an individual acts (Gopalan et al., 2017). Motivation can also be influenced by a variety of factors. For example, self-determination theory acknowledges autonomy, competence, and relatedness as factors necessary to foster motivation (Gopalan et al, 2017; Isik et al., 2018). Isik et al. (2018) reviewed literature to reveal factors that are influential towards the motivation of ethnic minority students specifically. Factors like sense of purpose, perceived sense of comfort in environment, positive self-concept, sense of belonging and attachment to school, ethnic affirmation and belonging, and more were linked with increased motivation (Isik et al., 2018).

Regarding increasing motivation to participate in learning by way of academic engagement, this could be done through providing materials of interest to students and also supporting student autonomy and choice, with the idea that it is motivating for students to have some control over their learning (Guthrie & Humenick, 2004; Ryan & Deci, 2009; Skinner et al., 2005).

Having a variety of reading materials available for students to choose from could be one way to increase engagement and academic achievement. While students' interests span across a wide range, research has shown that children may have a preference for individuals of their own race or ethnicity. Katz and Kofkin (1997) found that toddlers initially choose same-race children from photos of potential playmates. This race-matching preference was noted again at age 9 by Murray and Madara (2002). In fact, awareness of race is suspected to begin in early infanthood, and it is understood that children are able to self-identify their own race or

ethnicity by mid elementary/childhood years (Aboud, 1987; Katz & Kofkin, 1997). Children begin to develop an awareness and understanding of their own race, can begin to accurately self-label based on race, and engage in racial concepts and sorting of themselves and others based on race by the time they are 3 years of age (Luthar et al., 1997; Van Ausdale & Feagin, 2001).

Race/ethnicity is only one aspect of identity, though, and the concept of identity is complex. Identity, a "construct that defines who or what a person is" (Cheek & Cheek, 2020), is theorized as being based on social categorization and self-categorization, where people are categorized based on a specific similarity that identifies them as a member of an in-group or an out-group (Reicher, 2004). If identity can be seen as a category that can group individuals, then race/ethnicity, gender, sexuality, socioeconomic status, religion, disability, beliefs and values, even personal interests, previous experiences, and more can make up an individual's identity. This can further become complicated when considering intersectionality. First described by Kimberlé Crenshaw (1989, 1991), intersectionality explains the complexity that comes from overlapping identities. For example, Crenshaw wrote about the sexism and racism Black women face by being in both the category of female and Black (1989, 1991). The ways in which individual identity categories interact can lead to more complex identities, which also makes representation more complicated as well.

Representation is a similarly complex concept. When determining how to represent an individual, consideration must be given to how to identify that individual and thus how to indicate similarity between the individual and the representation. In line with the idea that identities are built from categorizations, depicting these categories is a method of representing identities (Moloney et al., 2007). Consideration in this study is being given to representation by categorizing different races.

Theoretical Assumptions

With these considerations, it is reasonable to predict that having reading materials that include diverse characters and characters that match the students' race and ethnicity available may be of more interest and thus lead to greater engagement. While there are various theories about identity, what influences identity most, and how to measure identity (Cheek & Cheek, 2020), this study does not include a check to determine whether participants feel their race is significantly important, impactful, engaging, or motivating in their identity. However, because of the evidence of children's awareness of race in a categorical sense and preference for racially similar individuals (Aboud, 1987; Katz & Kofkin, 1997), the scarcity of diversity seen in children's literature thus far (Gomez-Najarro, 2020; Huyck & Dahlen, 2019; Northrop et al., 2019), and the potential beneficial impact on motivation of increasing choice, relatedness, and positive regard towards ethnicity inclusion, affirmation, and belonging, (Gopalan et al, 2017; Isik et al., 2018), utilizing race to represent readers is assumed to be a valid approach in increasing reading comprehension. Whether the characters are playing sports, caring for animals, spending time with family or friends, or exploring new places, the increased representation of races and ethnicities that relate to students may enhance academic achievement through greater motivation and engagement.

Other researchers have found positive effects of providing stories with characters that match the race of the student. One student, an African American girl, was noted to reflect positively about and tend to prefer literature with strong Black female characters and experiences similar to her own (Sims, 1983). Similarly, Black youth reported being more engaged and affirmed when they could identify more with the characters in a story (Brooks, 2006; Sutherland, 2005). Further studies have shown how readers were more engaged with books that depicted

various aspects of their identity, such as refugee, immigrant, or multilingual experiences (Stewart, 2017).

Previous Studies

There have been a few studies that analyze the effects of matching the reader's race with the protagonist, though not many. Hardy et al. (2020) analyzed how engagement could be impacted by the race of the protagonists in preschooler's books. There were no significant differences between engagement for stories with White protagonists or Black protagonists, however, the trend showed that the Black and biracial preschoolers had more accurate responses, more initiations, and less teacher redirection needed during the stories with Black characters. This is also important given the link between engagement and learning. Additionally, when given the ability to choose a book, children were more likely to pick a book with a character whose race depiction matched their own. Choice can be motivating and impact engagement, so if students are more likely to choose a book with a character similar to themselves, having more racially diverse literature can provide more opportunity to engage minority students.

In another study, 73 primarily White children ages 6-8 listened to a storybook with either an "own-race or other-race protagonist" (Dore, 2015). The race of the characters was not explicitly stated within the story, but instead depicted through illustrations (i.e., White or Black characters). Researchers assessed the children's learning and memory from the story, as well as aspects like how they identified with the characters. Results showed that children were able to freely recall more information from the stories that had a main character that matched their own race compared to the stories with a character that did not match their race, although it was unclear whether this was due to readers identifying with the characters. While the researchers have noted various theories and limitations about the results, such as there being no Black

children in the sample, they still note the importance and potential benefits of inclusion in literature.

Another study focused only on African American students and sought to discover if reading material depicting students' race and culture would lead to greater comprehension compared to passages with White protagonists (Casteel, 1995). Student participants read two groups of passages, first a group of passages depicting African American protagonists and then White protagonists in another, and then completed a set of comprehension questions. Surprisingly, the comparison of comprehension scores after reading the various passages showed that students had higher test scores on stories with White protagonists than with African American protagonists. While this can imply that identifying with a protagonist does not impact comprehension, researchers noted that there were differences between stories with more than just protagonist race. For example, participants in the study made comments about how the stories with African American protagonists "are always putting people down," or "try to make fun of black people" (Casteel, 1995).

While the previous research on the impact of race representation in literature is inconclusive, there are limitations of the studies. In Hardy's (2020) study, there were positive results of including stories with diverse characters, but there was also a very limited sample size with only three participants. Dore's (2015) results were mixed, however none of the participants identified as Black, preventing analysis of true race-matched effects for Black students. Casteel's research (1995) was influenced by the negative portrayals of some characters. Because the stories being told were not parallel, the study did not solely measure the effect of race matching. The limitations of the current research and the inconclusive results indicate a need for further research on the topic of the effects of race representation in children's literature.

The Current Study

The purpose of this study was to contribute to the research examining the impact of race representation in children's literature on children's academic performance. Specifically, this research addressed the following questions:

1. Are students' comprehension scores higher when the character matches their race than when the character does not match their race?
2. Are minority students' comprehension scores higher when the character is also a racial minority than when the character is not a racial minority?
3. Do students tend to prefer the stories that depict characters that match their own race?

It is hypothesized that students will perform better on stories with a character that matches their race, and that minority students in general, or Non-White students, will also have higher comprehension scores on stories with a minority character. Similarly, the hypothesis for question three is that students will prefer the stories that depict a character whose race is similar to their own.

METHODS

Participants

The initial sample included 155 4th grade students enrolled in three different elementary schools in a northwestern Wisconsin district. The district included 13 elementary schools, three middle schools, two high schools, as well as an early learning program, a charter school, and a virtual school. In the 2021-2022 academic year, the district reported 74.9% of their students to be White. Approximately 0.5% of students identified as American Indian or Alaskan Native, 9.9% were Asian, 2.4% were Black or African American, 6.2% reported as Hispanic or Latino, 0.2% were Native Hawaiian or Pacific Islander, and 5.8% were reported as two or more races. The race distribution in each of the elementary schools sampled from was representative of the district-reported race distribution.

Participants who did not complete all components of the study, such as the self-report survey to indicate their race, were removed from further analyses, leaving 110 participants in the final sample. Of the 110 participants included in the final analyses, approximately 79.1% of students indicated that they were White (n = 87). About 10.9% of the students were Asian (n = 12), 3.64% were Black or African American (n = 4), 3.64% were Hispanic (n = 4), and 2.72% were American Indian (n = 3). There were slightly more participants that identified as girls (n = 58) than boys (n = 51), with one student not reporting their gender on the self-report survey.

Materials

To assess reading comprehension, AIMSweb MAZE passages were used. The MAZE passages used were fictional stories where, after the first sentence, approximately every seventh word was replaced by a group of three words. Readers are tasked with selecting the word that

best fits within the context of the story. These are designed to assess comprehension as the student reads, rather than through questions after completing a passage, for example (Hale et al., 2010). First utilized as a timed measure and within the curriculum-based measurement (CBM) framework around the late 1980s – 1990s, MAZE passages have shown adequate stability and they correlate with standardized measures of reading proficiency. Further, they are able to discriminate between readers with and without disabilities (Miura Wayman et al., 2007). With strong reliability and validity, MAZE passages are a frequently used indicator of student reading performance for elementary, middle, and high school students (Brown-Chidsey et al., 2003; Fuchs & Fuchs, 1992; Miura Wayman et al., 2007).

Two 4th grade level AIMSweb MAZE passages were utilized for this study. After the MAZE passages, a self-report survey was included. This survey prompted students to select their gender, race, and which story they preferred. The race categories on the survey were based on how the school district identifies their racial categories in their population on their annual report cards and were listed in alphabetical order. To determine story preference, a question on the survey mentioned a brief description of each story, each of which was ordered relative to how the stories appeared in the packet for the student. For example, the first story the student read was the first answer that was listed for the story preference question.

The passages were accompanied by pictures to represent the characters in the story. Images were obtained from an online stock photo collection. The photographer or artist who took each photo identified the subjects within the photo based on race, and a filtered search of available images resulted in two photos depicting Black or African American characters, and two photos depicting White characters.

Each packet contained two passages, and each passage had an accompanying photo. The passages were counterbalanced, so students either received the story about Jessica first or the story about Jason first. Additionally, the photos were different for each packet in that some students saw a photo of Jessica as a Black girl, and others saw her as a White girl. The other passage and character included in the packet was depicted as the opposite race. So, if a student had a packet with the story with Jessica first, and she was Black, then the next passage was a story about Jason, who was White in the photo. The students always received one story with a Black character and one with a White character, but the order and which passage depicted which race of character was counterbalanced. This was done to attempt to reduce novelty effects or fatigue effects, as well as to control for the potential impact of the gender of the character.

Procedure

The primary researcher administered the MAZE passages in the participating classrooms. Two weeks prior to the date of data collection, classroom teachers distributed passive consent forms. These forms provided information about the study, and offered caregivers an option to have their children opt-out of participation.

On the day of data collection, the primary researcher worked with participating teachers to visit the classroom during the regularly scheduled English/language arts or reading class time. Students who did not have caregiver consent to participate were given an alternative activity to complete at their desk or worked in another room during the procedures.

Procedures began with a brief introduction from the primary researcher followed by a practice MAZE which the class completed together with the guidance of the primary researcher. The class was instructed to listen while the researcher read the first practice sentence out loud.

The sentence was read with the three optional words, and then the researcher read the sentence three times, trying each word option. When the sentence with the correct word was read, and an explanation was given that that word makes sense in the sentence, the students were instructed to circle that word. The next two practice sentences were completed in a similar manner. Students were then instructed to turn to the first page and look at the picture for the story they would be reading. The following is the standard script for AIMSweb MAZE passages, which was read prior to starting the first passage:

> "When I say 'Begin,' start reading the story silently. When you come to a group of three words, circle the one word that makes the most sense. Work as quickly as you can without making mistakes. Keep working until I say 'Stop' or until you are all done. If you finish, put your pencil down. Are there any questions?"

After answering any remaining student questions, the primary researcher instructed students to begin and started a timer for 3½ minutes. When the time was complete, students were instructed to turn to the next page. Again, students were told to look at the new picture to see the character for the next story, and an abbreviated version of the instructions were given before starting the timer again.

When students completed both passages, and at the end of the 3½ minutes for the second passage, they were told to turn to the back page which consisted of a self-report survey. They were asked to complete the questions on the self-report survey to the best of their ability, and upon completion the primary researcher collected the packets with passages and self-report survey.

Scoring

Scoring was based on the answer key from AIMSweb MAZE. Correct items were awarded one point, while incorrect selections or skipped items were marked separately. Scores were denoted as items correct / items incorrect and skipped.

Interrater Observation Agreement

Another graduate student researcher reviewed 30% of the completed packets that were included in the analysis. The second observer scored passages in the same manner and used the same AIMSweb answer keys and scoring methods. The agreement between both raters was 99%. Disagreements were addressed and altered in the data set prior to analysis.

RESULTS

Race Representation and Comprehension Score

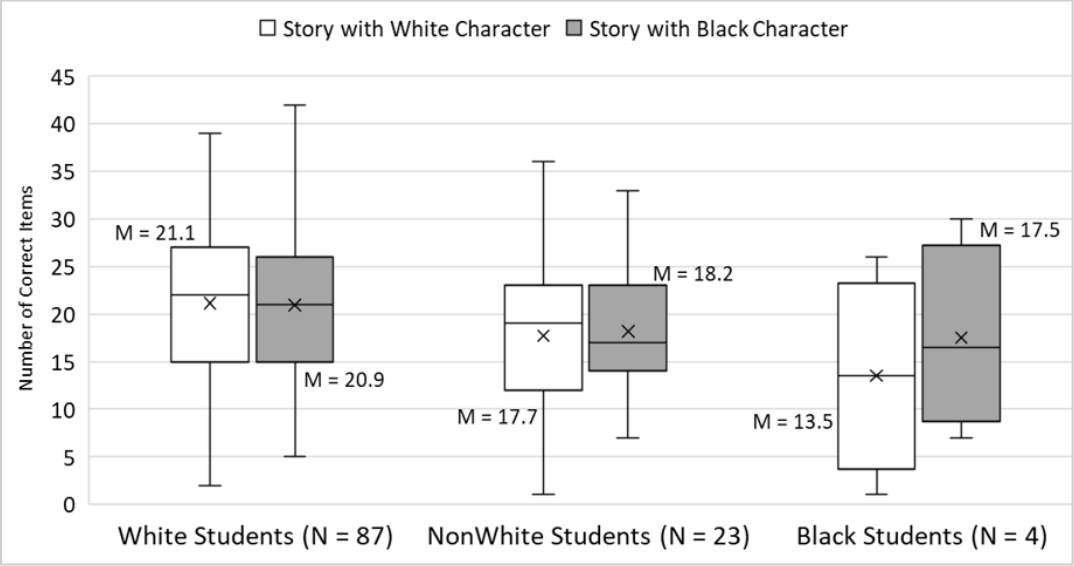
Paired samples t-tests were run to determine if students were better able to comprehend a story when the character was depicted as their same race. Black students selected more correct items in the passages with a Black character (M = 17.5, SD = 9.68) than in passages with a White character (M = 13.5, SD = 10.28) with a mean difference of 4 more correct items on stories with a racially matched character. This finding was significant, $t(3) = 4.90$, $p = .016$, *Cohen's d* = 2.45.

White students selected more correct items in the passages with a White character (M = 21.1, SD = 8.05) than in passages with a Black character (M = 20.9, SD = 8.02) with a mean difference of 0.184 more correct on stories with a racially matched character. However, this difference was not significant, $t(86) = 0.264$, $p = .792$, *Cohen's d* = 0.0283.

An additional paired samples t-test was conducted to compare the performance of all students that did not identify as White on the self-report survey. The Non-White students performed slightly better on stories with Black characters (M = 18.2, SD = 7.13) compared to stories with White characters (M = 17.7, SD = 7.99), although this was not a significant difference, $t(22) = 0.545$, $p = .591$, *Cohen's d* = 0.114. Diverse students answered, on average, 0.435 more items correct when the story had a diverse character compared to a White character.

Figure 1

Race Representation and Comprehension Score



Race Representation and Accuracy Score

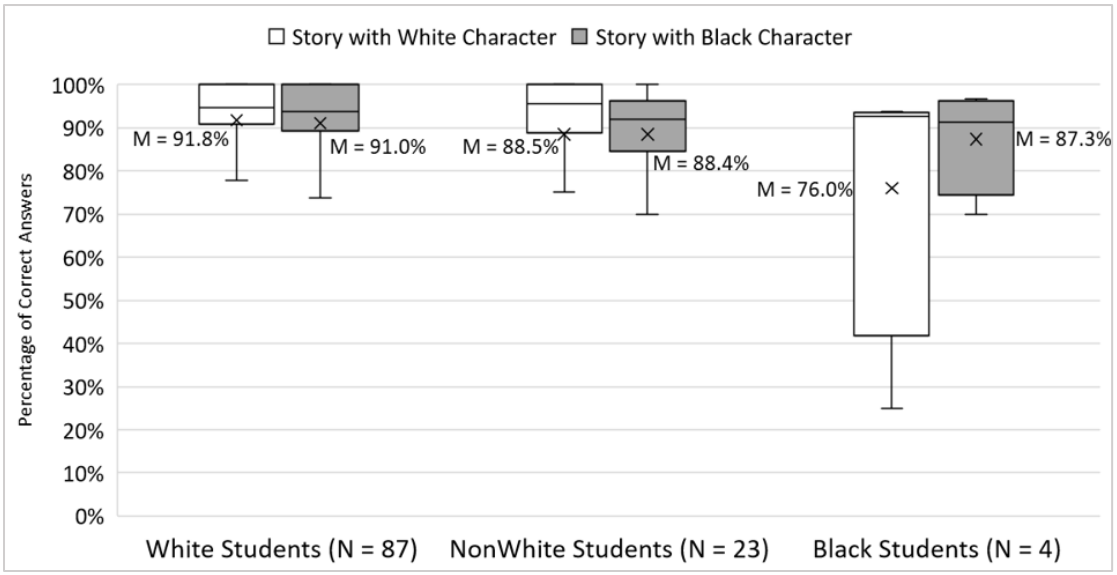
Paired samples t-tests were conducted in a similar manner to compare the accuracy of students who identified themselves as Black on stories with a Black character and a White character. On average, Black students had higher accuracy rates on stories with Black characters (M = .873, SD = .122) than on the stories with a White character (M = .760, SD = .340). Black students, on average, had 11.3% greater accuracy on stories with a character that matched their race. This finding, however, was not significant, $t(3) = 0.998$, p = .392, *Cohen's d* = 0.499.

For White students, a paired samples t-test revealed their accuracy rates, on average, were very similar for both stories with White characters (M = .918, SD = .120) and stories with Black characters (M = .910, SD = .120), averaging less than 1% better accuracy on stories with a racially matched character. This was also not a significant result, $t(86) = 0.513$, p = .609, *Cohen's* d = 0.0550.

Again, consideration was given to how all Non-White students performed on the passages with White characters and the passages with Black characters, or diverse characters. Paired samples t-testing revealed that, when considering all students that did not identify themselves as White, the average accuracy was also very similar. The accuracy for Non-White students when reading a story with a Black character (M = .884, SD = .115) and a story with a White character (M = .885, SD = .218) was less than .1% lower, on average. This was not a significant difference, $t(22) = 0.00580$, p = .995, *Cohen's d* = 0.00121.

Figure 2

Race Representation and Accuracy Score



Story Preference

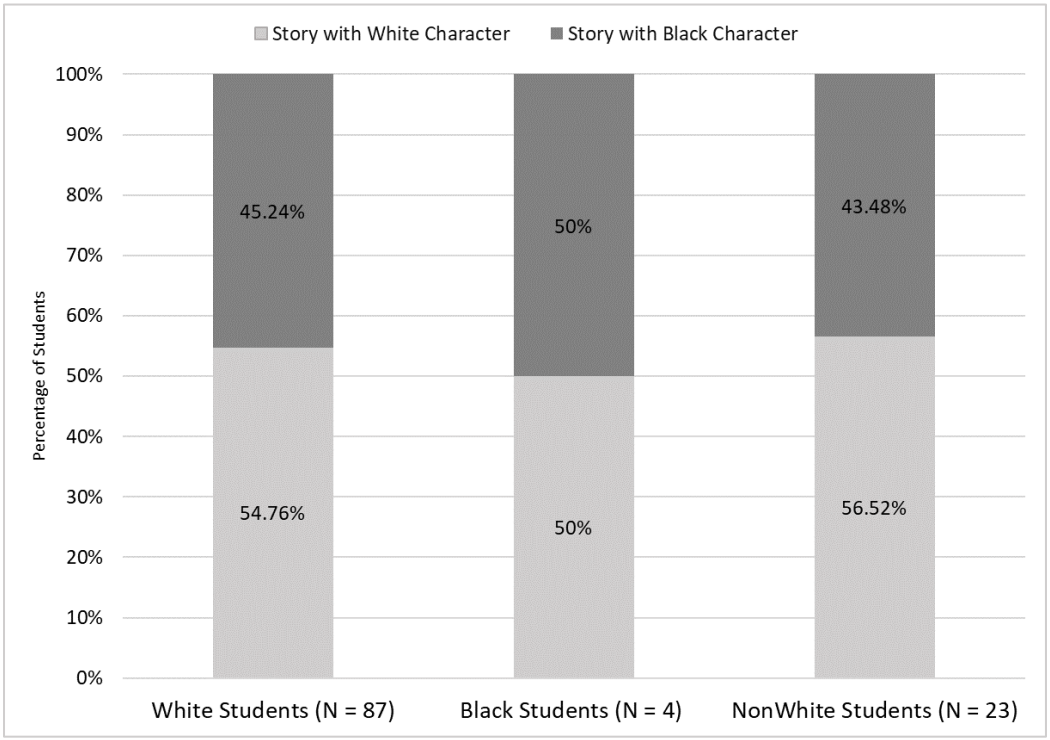
A Chi-Square Test was used to evaluate whether students would be more likely to prefer the story with a character that matches their race. However, this hypothesis was not supported, $X^2(1, N = 88) = 0.0349$, p = .852, *Cramer's V* = .0199. Of the 84 students who identified themselves as White, 54.8% of them preferred the story that had a White character and 45.2%

preferred the story with a Black character. The 4 students who identified themselves as Black were evenly split in their character preference, with 50% preferring the story with the Black character and 50% preferring the story with the White character.

When considering the story preference of White students compared to all Non-White students, the hypothesis was that diverse students would prefer the story with the diverse character. This was not supported, $X^2(1, N = 107) = 0.0226$, $p = .880$, *Cramer's V* = 0.0145. Of the 23 students in the sample who identified as a race other than White, 43.5% reported preferring the story with a Black character, the diverse character, and 56.5% reported preferring the story with a White character.

Figure 3

Percentage of Students who Preferred the Story with a Black or White Character



While there was not a significant effect of character preference, a paired samples t-test revealed that the students who reported preferring the story with a Black character performed significantly better on that story (M = 21.6, SD = 7.92) compared to the story with a White character (M = 19.5, SD = 8.94), $t(47) = 2.92$, $p = .005$, *Cohen's d* = 0.422. In fact, students who liked the story with a Black character better answered, on average, 2.1 more items correctly on that story compared to the story with the White character.

While a similar trend was seen for students that reported preferring the story with a White character, this finding was not significant. Those that liked the story with the White character performed better on that story (M = 20.9, SD = 7.52), than the story with the Black character (M = 19.5, SD = 7.99), but only by an average difference of about 1.42 items ($t(58) = 1.75$, $p = .086$, *Cohen's d* = 0.228).

The accuracy rates were also slightly higher for the stories that students reported liking more, but there was no significant difference from the paired samples t-tests. Students who preferred the story with the Black character had greater accuracy on that story (M = .927, SD = .0854) than the story with a White character (M = .899, SD = .1654), but the difference was insignificant and approximately 2.78% ($t(47) = 1.32$, $p = 1.94$, *Cohen's d* = 0.910). Also, students who liked the story with a White character had greater accuracy on that story (M = .918, SD = .131) than the story with a Black character (M = .888, SD = .141), but this was not significant either ($t(58) = 1.79$, $p = .079$, *Cohen's d* = 0.233) and resulted in an average difference of about 3.05%.

DISCUSSION

Interpretations

The aim of this study was to evaluate the effect of race representation on reading comprehension. Reading comprehension can play a role in many other academic content areas (Cimmiyotti, 2013; Cromley, 2009; Graham et al., 2021; Kim & Graham, 2022; Vilenius-Tuohimaa et al., 2008), therefore improving reading comprehension could improve overall academic achievement. Increasing the diversity in reading literature may support the academic achievement of diverse students.

It was hypothesized that students would perform better on the stories with characters that were similar to them in race. While some previous studies show a potential trend for students to perform better with materials that represent their race, this hypothesis was not fully supported in the current study. White students' comprehension scores did not differ between the story with the White character and the story with the Black character, but Black students' comprehension scores were significantly higher on the story with the Black character than the story with the White character. Also, the effect size for the comparison of the number of correct items scored for Black students in stories with a race-matched character and those with a non-matched character was large (where *d* of 0.2 = small, 0.5 = medium, and 0.8 = large effect size (Cohen, 1977)).

It should be noted, though, that the sample of Black students was very small, with only four participants. This may have skewed the results, although similar trends were seen with other groups in that White students tended to better comprehend the story with a character that matched their race, but not significantly so.

Because there was a large range of total correct scores across students and passages (min = 1, max = 42), the accuracy of students' responses was also considered. Accuracy, defined here as total correct items divided by total items attempted (including incorrect and skipped items), is not typically how MAZE passages are scored and normed. However, this was meant to reduce the impact of varied reading levels, as students with lower reading fluency would be less likely to have higher total items correct but may still have better accuracy of the items attempted when the story was about a character that matched their race.

Similar trends were found when considering the accuracy of responses, in that Black students tended to have higher accuracy on stories with Black characters, although this finding was not significant. The difference in accuracy for White students was also insignificant and shown to be on average less than 1% different between stories.

The second hypothesis focused on the performance of all students that did not report identifying as White, in order to determine if having diverse representation had an impact on diverse students as a whole. This hypothesis was not supported. When considering all Non-White students (students that identified as Black, Asian/Pacific Islander, American Indian/Alaska Native, and Hispanic/Latinx), their comprehension scores for items correct and accuracy were not significantly different between stories with characters of different races.

The third research question hypothesized that participants would be more likely to prefer the story that depicted a character matching their own race. Research has found that children, particularly diverse youth, may prefer content, stories, and characters that are similar to them (Brooks, 2006; Sims, 1983; Stewart, 2017; Sutherland, 2005). Additionally, interest in material can impact engagement, which relates to performance (Christenson et al., 2013). In this study, this hypothesis was not supported. That is, students did not report greater preference for the

stories with characters that matched their race. Again, the small sample size may have impacted the results. For example, with only four students identifying themselves as Black/African American, there was an even split in reported story preference between stories with a Black character or White character. There may be trends, given White students reported slightly higher rates of preferring the story with the race-matched character, but these were not significant either.

Although there were not significant findings in story preference, it is still important to consider whether students will perform better on the story they do prefer. Hypothesizing that students would have more correct items selected on the story they reported liking more, these additional analyses were conducted. There were significant findings supporting this, and trends consistently showed that students had higher comprehension scores, measured both by total items correct and accuracy, on the stories they reported preferring. This indicates that preference can play an impactful role in academic achievement. In only one condition was this finding significant, though, and that was for students who liked the story with the Black character having more correct items for that story than in the story with the White character. It should be noted, though, that students were asked to report which story they liked more after having read both stories. Their choice could have been impacted by their perceived performance, rather than preference for the content or a feeling of connection to the character.

Implications

The greatest implication from this study is the need for more research to be done to better understand the effect of race representation. While there were general trends seen across analyses, there was only one significant finding for the effect of race representation on reading comprehension, and this was when examining the scores of Black students. Only four students

identified themselves as Black. This sample size does not provide strong power or generalizability, so further research should be conducted.

Given the significant findings for Black students and the insignificant differences in comprehension for White students, while increasing racial diversity in reading materials may benefit diverse students, it likely will not have a negative impact on White students. Advocates for increasing diversity in reading materials have stated that doing so would benefit White students by broadening their view of the world (Sims, 1983) and preventing a "false sense of superiority" (Bishop, 1990). In fact, research from decades past has worked to show that exposure to diverse characters, especially those portrayed positively, can improve White students' attitude toward other races (Jackson, 1944). Due to the potential benefits in other factors, and the lack of negative consequences seen here for reading comprehension, classrooms should work to increase the diversity within the reading materials available for students.

Additionally, students were generally better able to comprehend passages that they report liking more. When students read about something they prefer, they better comprehend the content. However, the causal factor for student's preferences is unknown. Students may have reported liking the story that they felt they comprehended better, rather than having preference driven by a variable like race representation. More research needs to be conducted to understand what is most salient for students in liking and engaging with reading materials. With this in mind, it could still benefit students to provide them with a range of materials to learn from. This includes materials with a range of character representation.

Overall, these findings imply that school districts, administrators, teachers, and other important stakeholders in children's education should intentionally seek out diverse reading materials. Having different races represented in the materials students learn from, and allowing

for students to experience racially matched characters in stories, can be impactful for the reading comprehension of minority students. Additional research should be done to better understand the effects of race representation on reading comprehension and on other salient variables in academic achievement.

Limitations

Various limitations are present in the current study. Primarily, within the sample of student data utilized, the portion of diverse students was small. Even smaller was the number of students who identified as Black or African American, which would be the more exact student-character race matches. Low sample sizes and low representation within the sample lessens the power of the statistical analyses, thereby reducing the accuracy of the estimates and indicating the results are not able to be generalized (Hallahan & Rosenthal, 1996).

Beyond having small representation of different races within the sample, the representation of races within the reading materials is also small. Each passage had a picture of the character, but this one depiction was intended to represent that the character was either White or Black. There is vast diversity even within one race. A range of differences in skin tones, hair textures, facial features, and more can be seen across individuals from the same race category. Using one image to represent an entire race may lead to students of the same race that is being depicted still not identifying with the character.

Additionally, a pictorial representation may not be enough to feel connected to a character, even if a student does feel that the character matches their race. As Sim's (1983) describes, some books, referred to as "melting pot" books, depict diverse characters in a way that their only difference is their skin color. These stories negate any cultural differences. Similar to

this study, these types of books indicate ethnicity only through illustrations. While the students reading the passages may have recognized that a character was similar to them in skin color or other superficial ways, without cultural uniqueness, the race of the character may not have been salient enough for students to engage with the stories differently.

Even if the image and character depicted was representative of a race to a student and impactful to them, the way in which students interacted with and processed the image can vary greatly between individuals. While students were instructed to look at the picture associated with the passage to indicate the race of the character they would be reading about, students may still have responded differently to the image. For example, some students were observed to flip the page with the picture under the passage while they read and worked through it, thus the image was not visible for the duration of the reading period. Some students covered the image with their arm as they circled words in the passages. The intent was that looking at the picture prior to reading would cue the participants to understand that the character they were reading about was either Black or White, but this may not have been an effective cue for some participants.

Further, the role of race in a child's identity can vary, and even the awareness of race can vary. Therefore, the self-report survey data that was used may not be entirely accurate. For example, a few students were observed to have questions regarding the survey and what race they were, with some students making remarks such as "My dad says we are German, so I'm not any of these." Research shows that young children can identify and classify based on race (Luthar et al., 1997; Van Ausdale & Feagin, 2001), but perhaps the labels associated with different races are not salient to these 4th grade students. That being said, some students may not associate race as the most salient factor to identify with a character. Other factors of identity, such as gender or even interest in the content of the story, may be more impactful.

When completing the self-report survey, some students did not complete the race question or selected "other." This means that a portion of data is lost and unable to be considered. This may have been prevented if student files had been reviewed and the race that families note for their student was used to categorize students. However, the method used in this study was intentional as the self-report survey allowed for students to self-identify. This again brings up the potential issue of how important race is at this age, but also allows students that are aware of their race to respond based on what is most important for them. Because this research focused on the impact of a character in reading materials that matches the race of the reader, the reader's awareness and value of their own race is an important consideration if we are to assume that race representation can be impactful.

Unfortunately, there were some differences between the passages that mean they cannot be truly reviewed as a one-to-one comparison. For example, there was a slight difference in how many items each story had (one story had 40 total items, the other had 42). The formatting looked different, as well. Because each story was formatted to fit on one page, the story with more words may have been visually processed differently than the other, allowing for external variables to impact how students read and responded. There may even be cultural or contextual factors that could have made the stories differently accessible. One story told of a girl wearing her glasses for the first time, and the other of a boy visiting with his grandfather. Students with different experiences with these topics may experience differences in comprehension of the stories being told. These extraneous variables are not able to be controlled, but having a larger range of passages and content, or doing some sort of pre-screening, would potentially reduce the effect of these variables.

Another limitation present in the methodology is that there was no fidelity check for the administration of the passages. The primary researcher read from a script, but did not complete a fidelity checklist or have an additional observer review the steps to ensure they were completed in a standardized fashion and similarly across all classrooms. Differences in how instructions were presented or what information was given could impact how students interacted with the materials.

The passages were administered class-wide to decrease the disruption to the typical class schedule. However, administering group-wide has some limitations in that students were not able to be closely monitored to check that they were interacting with the task as expected, stopping when the time was up, or completing the self-report survey to the best of their abilities.

Future Directions

The academic achievement gap is persistent and impacts many students in the nation (NAEP, 2022). There needs to be continued research on ways to support the academic achievement of minority students. Due to the significant lack of racial representation seen in children's reading materials, further research is also needed to explore the impact of race representation for students. A replication of the current study with a larger sample size, including a larger sample of Non-White students, would be beneficial in order to establish whether trends seen here could be replicated and generalized.

A replication of this type of research with modifications to some areas could also help establish trends while reducing the impact of some limitations. For example, if students were to read more stories, there would be more opportunity to have variety within the stories and look for trends in what has the most effect, such as a race or gender match, a story about a topic or

activity that the student enjoys, and so on. Another alteration that should be explored are stories that explicitly state the race of the character. Explicitly stating the characters' race could help determine whether visual depictions are enough, or if race labels are more or less relevant for students at this age. What could also help with making stories more meaningful and connecting to characters would be including culturally significant information. Beyond showing a picture of a character and assuming that students will understand that character's racial identity, including stories that are unique to different cultures would potentially give students something more specific to identify with. This does eliminate the parallel structure that was intended for this study, but that may reveal that visual depictions are not enough for representation to have an effect.

Further, examining representation of races beyond Black and White characters is needed. The sample of students in this study included individuals who did not identify as Black or White. While all Non-White students were grouped together to determine if there was any impact to diverse students reading about a diverse character, there was no opportunity for exact race-matching for many students. Future research should be done to explore the impact of race representation for students who identify as neither White nor Black. In addition, the pictures used in future research should display broader representation within the races. Including a variety of individuals from one race may increase the likelihood that a student of that same race identifies with the character as there is a greater chance that they see someone like themselves represented.

For this particular study, 4th grade students were included in the sample. However, future research should continue to explore the effect of race representation on students in other grades and other ages. Reading comprehension, other measures of reading, and even other content areas

can be assessed to explore the broader impact that race representation may play on academic achievement of diverse students.

It may also be interesting to explore the impact of race representation in different settings. This study was conducted in a predominantly White district, but results may look different when the general population is more diverse. The salience of race representation in reading materials may be influenced by how much representation is available in other contexts, such as through peers, teachers, neighbors, educational materials like historical figures being taught about, popular individuals in the media, and more. Further research can help clarify if race representation is important across all settings or if it is more impactful to students who are more minoritized.

While there may not have been more significant effects seen in this study of race representation on reading comprehension, there may have been effects on other factors that were not measured. For example, a feeling of belongingness could be impacted by race representation. Belongingness, or a feeling of being "personally accepted, respected, included, and supported" (Goodenow & Grady, 1993) in school, has been related to academic achievement and other influential factors, such as motivation and engagement (Goodenow & Grady, 1993; Neel & Fuligni, 2013). More research needs to be conducted to examine the effect of race representation on belongingness and other variables that play a role in academic achievement. Increasing the diversity of characters presented to students may have a positive impact on engagement, motivation, belongingness, or many other concepts that can subsequently play a role in a student's academic achievement. Research specifically measuring these, and other variables will help expand the literature and show the importance of representing races in schools.

In conclusion, general trends were seen across analyses, but the only significant finding was that Black students, on average, answered more items correctly when reading a story with a Black character. This indicates that there may be benefits to increasing diversity in reading materials as it can increase the reading comprehension of diverse students when they read materials with characters that match their race. However, the sample size for these students was small, and many other limitations could have impacted results. More research is needed to better understand the effects of race representation on reading.

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APPENDICES

Appendix A

MAZE Passages

Passage 1

Jessica stared at the new black-rimmed glasses on her nightstand. As she lay in bed, many **(mornings, questions, nightstand)** ran through her head. "Are these **(buses, later, frames)** too ugly? Are kids going to **(laugh, these, quiet)** at me when I get on **(the, new, bed)** bus? Should mom have bought me **(too, an, the)** rectangular ones?"

Suddenly, Jessica saw 7:13 **(at, as, on)** the clock. She didn't feel like **(eating, quickly, frames)** breakfast and quickly got ready. She **(stared, packed, thought)** her backpack and said goodbye. "I'm **(like, sure, her)** things will be just fine," her **(mom, bus, head)** said as Jessica left the house. **(Her, They, She)** ran down the driveway and saw **(she, the, her)** friends waiting for the school bus. **(Other, Today, Things)**, of all days, Johnathan was already **(then, math, there)**.

Johnathan was the meanest kid at **(the, an, to)** bus stop. He was always bossing **(goodbye, Jessica, people)** around and teasing them. "Hey, here **(sure, these, comes)** Four Eyes," he shouted.

"Be quiet, **(Johnathan, backpack, Vanessa)**. I think Jessica looks awesome!" said **(packed, Vanessa, things)**. Vanessa was in Jessica's math class. **(Jonathan, Locker, Jessica)** liked her because she wasn't afraid **(of, for, to)** stand up to anyone.

She thought **(kids, them, saw)** might stare when she got on **(all, she, the)** bus. To Jessica's surprise, no one **(Vanessa, laughed, thinks)** at her. Later at school, she **(rectangular, breakfast, remembered)** the note she needed to leave **(in, on, bus)** the office. For the first time, **(have, her, she)** noticed that the secretary, Mrs. Green, **(ran, wore, and)** glasses. Then the health aide, Leslie, **(think, came, feel)** to make a copy. She had **(glasses, already, goodbye)** on too.

Jessica couldn't help but **(sudden, tease, notice)** that lots of teachers wore

glasses. **(Here, That, House)** made her feel a little less **(shouted, thought, nervous)**. Her teacher, Mrs. Hadwick, was not **(awesome, noticed, wearing)** her contact lenses today. She was **(wearing, stared, needed)** new glasses!

"Good morning, Jessica," she **(help, said, here)**, "I love your new glasses. You **(bought, packed, remind)** me of that teenage star who **(wore, sings, copy)** 'Don't Be Scared.'" Jessica loved that **(song, then, stop)** and had a poster of the **(nervous, think, famous)** singer in her locker.

All day **(saw, new, long)** she noticed the difference her glasses **(made, felt, she)**. Letters were sharper, and she could **(got, see, stop)** the board better. She thought it **(like, was, had)** easier to see exactly how many **(posters, houses, minutes)** were left until recess.

"This day **(loved, wasn't, first)** so bad after all," Jessica thought.

Passage 2

Jason sat and waited for his grandfather to arrive. He always enjoyed his grandfather's visits. **(Jason, Waited, Said)** could see the old car slowly **(sat, play, make)** its way down the street toward **(see, old, his)** house. Finally, Grandpa's old car pulled into **(an, what, the)** driveway.

"Grandpa! Grandpa!" Jason shouted. "You're **(same, here, house)**!"

"Hello, Jason. How is my favorite **(backyard, waiting, grandson)**?" Grandpa chuckled.

"Well, I'm just dandy," **(said, for, could)** Jason. "Thank you for asking."

Grandpa **(or, and, his)** Jason walked into the house. Jason **(asked, liked, helped)** his grandfather carry his bags. They **(wore, spent, dandy)** a wonderful day together playing in **(old, an, the)** backyard. Jason sat by his grandfather **(them, that, said)** night.

"Grandpa, what did you do **(when, dandy, for)** you were little?"

The grandfather looked **(of, way, at)** his grandson and answered, "Well, what **(a, do, now)** you do when you play?"

Jason **(enjoyed, answered, chuckled)**, "We play games in my basement. **(We, His, For)** play catch in the backyard. We **(same, carry, play)** football in the empty lot down **(an, the, us)** street. After school, my friends and **(me, of, I)** watch television shows. Sometimes my mom **(radio, takes, plays)** us to see a movie at **(the, an, walk)** mall."

Grandpa smiled and said, "Jason, **(I, we, a)** used to do the same things **(when, plays, wait)** I was a boy."

"Really?"

"Really. **(I'm, At, In)** my old neighborhood, we would pick **(teams, watch, radio)** and play basketball in a sandlot. **(The, At, On)** school we played football. We didn't **(see, catch, have)** facemasks. We wore leather helmets and **(ride, soft, empty)** pads in our shirts. When I **(for, and, was)** a young boy, we didn't have **(wonderful, television, basements)**. We only had radio. My friends **(were, or, and)** I would gather around the radio **(only, and, to)** listen to shows like 'The Lone **(Ranger, visits, Grandpa)**' and 'The Shadow.' On Saturdays, we **(gather, would, dandy)** ride our bikes to the movie **(school, wore, house)** and watch cartoons or a double **(listen, feature, street)**. The movies had singing cowboys and **(neighborhood, superheroes, television)**."

Jason asked his grandfather, "Can we **(play, see, pads)** a movie together this Saturday?"

"Yes," **(takes, only, said)** Grandpa. "I think we should."

Appendix B

Pictures Accompanying Passages

Appendix C

Self-Report Survey

Check the box that best fits you for these three questions:

1. The story I liked most was the one about…

☐ Jessica wearing her glasses

☐ Jason talking to his grandpa

2. I am a…

☐ Boy

☐ Girl

☐ Other

3. I am… (you can pick more than one)

☐ American Indian / Alaska Native

☐ Asian / Pacific Islander

☐ Black / African American

☐ Hispanic / Latinx

☐ White / Caucasian

☐ Other

Appendix D

Practice Page

Practice

The dog **(apple, broke, ran)** after the cat. The cat ran **(green, fast, for)** up the hill. The dog barked **(in, at, is)** the cat.